

ARMY SERVICE FORCES MANUAL

M 365-10

CIVIL AFFAIRS HANDBOOK

THE PHILIPPINES

SECTION 10: PUBLIC WORKS
AND UTILITIES

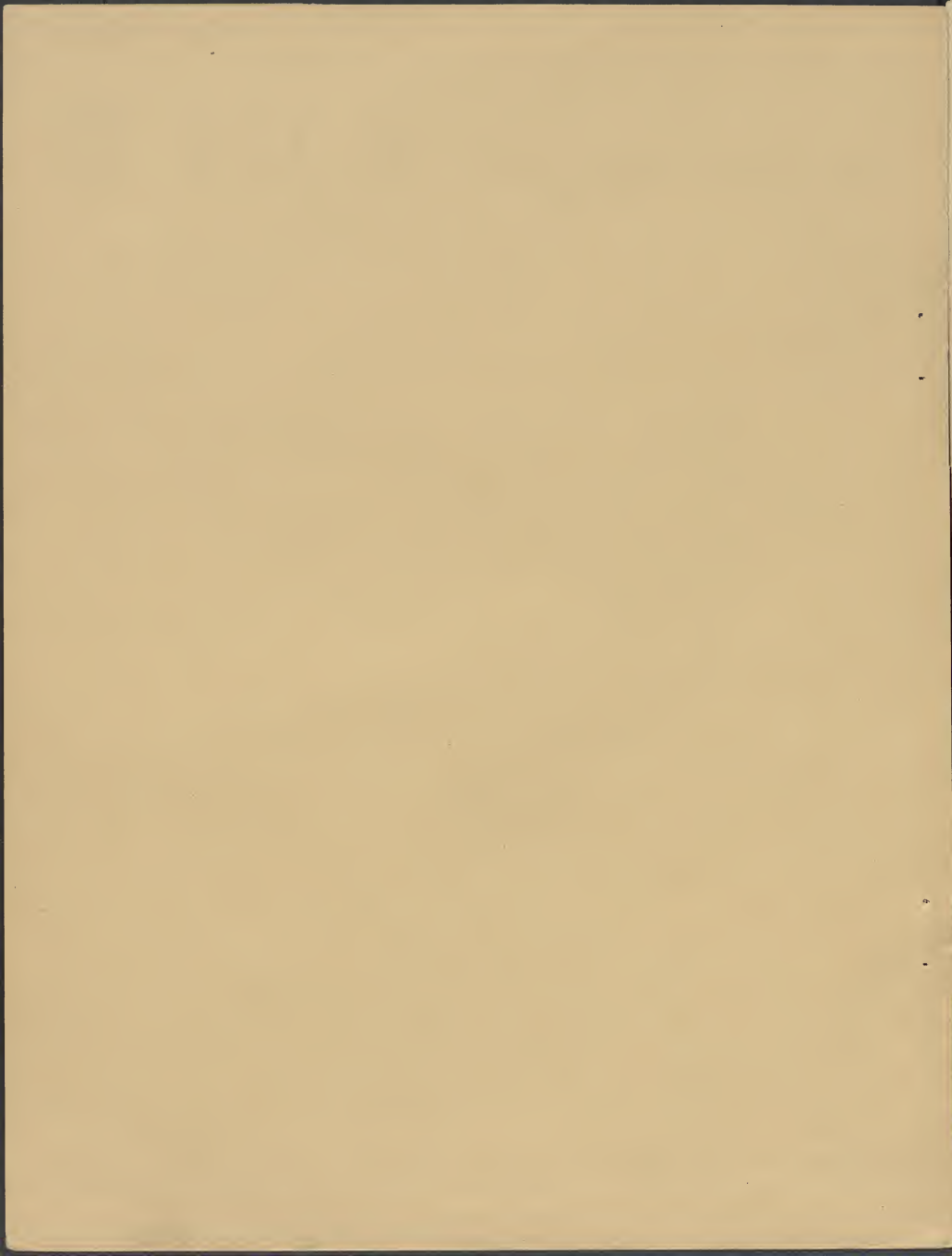
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HEADQUARTERS, ARMY SERVICE FORCES

21 OCTOBER 1944



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SECTION 10: PUBLIC WORKS
AND UTILITIES



Headquarters, Army Service Forces 21 October 1944

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NUMBERING SYSTEM OF
ARMY SERVICE FORCES MANUALS

The main subject matter of each Army Service Forces Manual is indicated by consecutive numbering within the following categories:

M1 - M99 Basic and Advanced Training
M100 - M199 Army Specialized Training Program and Pre-
Induction Training
M200 - M299 Personnel and Morale
M300 - M399 Civil Affairs
M400 - M499 Supply and Transportation
M500 - M599 Fiscal
M600 - M699 Procurement and Production
M700 - M799 Administration
M800 - M899 Miscellaneous
M900 - up Equipment, Materiel, Housing and Construction

* * * * *

HEADQUARTERS, ARMY SERVICE FORCES,
Washington 25, D. C., 21 October 1944.

Army Service Forces Manual M 365 - 10, Civil Affairs Handbook -
The Philippines, Section 10, Public Works and Utilities, has been prepared under the supervision of The Provost Marshal General, and is published for the information and guidance of all concerned.

[SPX (21 Sep 45)]

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This study on Public Works and Utilities in The Philippines was prepared
for the
MILITARY GOVERNMENT DIVISION, OFFICE OF THE PROVOST MARSHAL GENERAL
by the
FAR EASTERN UNIT OF THE BUREAU OF FOREIGN AND DOMESTIC COMMERCE
UNITED STATES DEPARTMENT OF COMMERCE

OFFICERS USING THIS MATERIAL ARE REQUESTED TO MAKE SUGGESTIONS AND
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INTRODUCTION

Purposes of the Civil Affairs Handbooks

The basic objective of Civil Affairs Officers are (1) to assist the Commanding General by quickly establishing those orderly conditions which will contribute most effectively to the conduct of military operations, (2) to reduce to a minimum the human suffering and the material damage resulting from disorder, and (3) to create the conditions which will make it possible for civilian agencies to function effectively.

The preparation of Civil Affairs Handbooks is a part of the effort to carry out these responsibilities as efficiently and humanely as possible. The Handbooks do not deal with plans or policies (which will depend upon changing and unpredictable developments). It should be clearly understood that they do not imply any given official program of action. They are rather ready reference source books containing the basic factual information needed for planning and policy-making.

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T O P I C A L O U T L I N E

1. Geographical and Social Background
2. Government and Administration
3. Legal Affairs
4. Government Finance
5. Money and Banking
6. Natural Resources
7. Agriculture
8. Industry and Commerce
9. Labor
10. Public Works and Utilities
11. Transportation Systems
12. Communications
13. Public Health and Sanitation
14. Public Safety
15. Education
16. Public Welfare
17. Cultural Institutions

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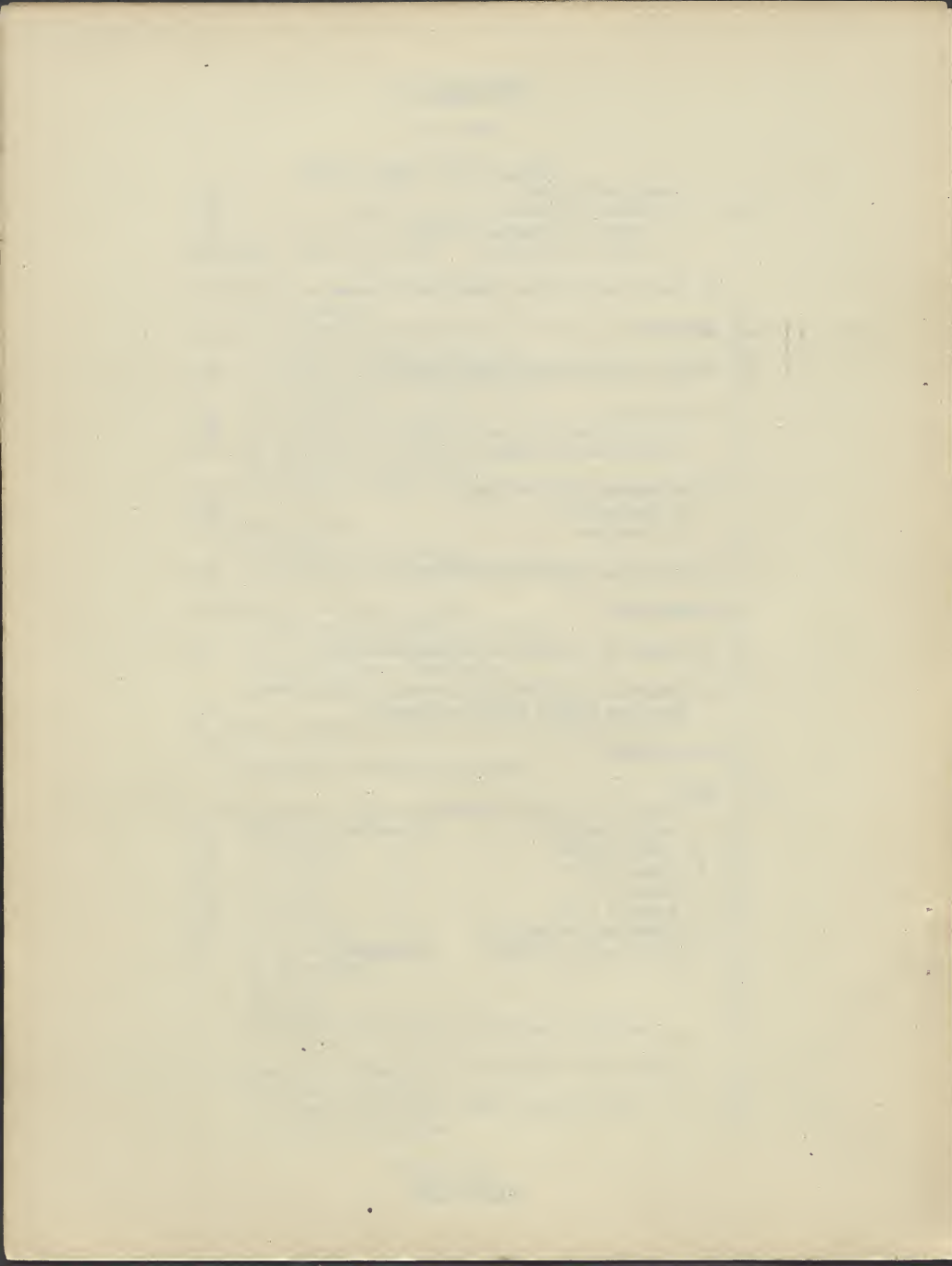
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I. POWER, LIGHT AND WATER

A. Hydro-electric and Steam

1. Ownership

Private enterprise was responsible for about 90 percent of the production of electricity in the Philippines before the war and controlled about 95 percent of the total assets of the electric power industry. In 1938 there were 195 electric light and power companies producing electricity for sale. They operated 355 generators having a total rated capacity of 75,480 KW. 1/ Ownership of the companies was classified by the Census of January 1, 1939, as follows:

Electric Power Companies - 1938

<u>Form of Ownership</u>	<u>Percent Distribution</u>			
	<u>Gross</u>			
	<u>Production</u>	<u>Assets</u>	<u>Income</u>	<u>Employees</u>
Private:				
Corporation	87.1	88.4	87.0	77.1
Individual	2.5	4.4	5.6	14.0
Partnership	0.6	1.1	1.3	2.8
Association	0.2	0.3	0.3	0.7
Government	9.6	5.8	5.8	5.4
	100.0	100.0	100.0	100.0

Citizenship of Owners. - Of the total assets of the electric light and power industry — reported by the Census as 11,459,200 pesos (\$5,729,600) — 20.3 percent was owned by private Philippine citizens and 5.8 percent by agencies of the Philippine Government. Citizens of the United States controlled 73.1 percent of the total assets, while the remaining 0.8 percent represented insignificant holdings of Chinese, British, Canadian, and Australian citizens.

2. Government Supervision and Participation

The development of water power in the Philippines was relatively slow. Some authorities claimed that most of the streams in the Islands, while adaptable for generating a few hundred horsepower of energy for local use, were not susceptible to commercial development on a large scale. With inauguration of the Commonwealth in 1935, however, it was realized that if industrialization were to be encouraged in line

1/ Three electric light and power companies did not produce electricity but purchased energy from other plants, making a total of 198 light and power companies operating under franchise from the Public Service Commission. In addition to companies producing electricity for sale, a number of industrial establishments, mining companies and sawmills produced electricity for their own use. These are discussed later in the text.

with commitments of the new regime, cheap power must be provided. The new Government, therefore, was granted constitutional authority to control all power sites and power development projects, and in 1936 the National Assembly appropriated 250,000 pesos (\$125,000) as initial capital of the National Power Corporation, giving it authority to issue bonds in the amount of 20,000,000 pesos (\$10,000,000) to finance the development of the country's hydro-electric resources.

The first federal power project was well under way by 1940. The plant, located about 50 miles from Manila, at Caliraya in Laguna Province, was to produce around 110,000,000 KWH a year. The Government planned to generate power for industrial enterprises near Caliraya and sell the surplus to the Manila Electric Company, largest power company in the Islands, and to townships which could be served from the company's transmission lines. If all the power were used, the cost was estimated at less than one-half cent per kilowatt hour. The project was nearing completion toward the close of 1941, final installations having arrived from the United States just prior to arrival of the Japanese.

The National Power Corporation also made surveys — under the direction of two American Army engineers — of about 250 sites with potential production estimated at from 200 horsepower for the smallest to 400,000 for the largest. Two of the largest sites considered were those on the Agno River in Luzon and on the Agus River near Lake Lanao in Central Mindanao. It was estimated that as much as 400,000 horsepower could be developed at low cost on the Mindanao site. To supply a market the Government had under consideration the erection of a steel mill and industrial establishments and building of electric railways to serve the area. It was expected that the Agno River project in Luzon would approximate the Government's plant at Caliraya in cost and production capacity. Power from such a project would be available for sale to mines in the Baguio district, where fuel and transportation costs were high.

Other proposals of the National Power Corporation included the erection of a large diesel plant in the Manila Port Area to supply light and power to insular government agencies and government companies. The plan, however, was never consummated, and the Caliraya plant was the only federal government power project actually undertaken before the war.

3. Manila Electric Company

The American-owned Manila Electric Company was the most important producer of electric power, its plants accounting for about 75 percent of the total generating capacity of public utility plants. The company supplied power to Manila and Central Luzon, chiefly from a 29,500 KW thermal plant in Manila and from a 17,608 KW hydroelectric station in

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Laguna Province, about 60 miles south of the city. The Central Luzon area was supplied by small diesel power plants operated in La Union, Pangasinan, Tarlac, Nueva Ecija, Batangas, Tayabas, Camarines Sur, Albay, and Sorsogon Provinces. 1/ The company's total output of electricity in recent years was as follows:

Manila Electric Company Production

	KWH
1935	111,177,660
1936	116,140,030
1937	130,483,380
1938	144,823,030
1939	158,385,040
1940	175,381,460

4. Other Utility and Industrial Power

The Census of 1939 — latest data for the country as a whole — reported total production in 1938 of 208,665,890 KWH of public utility power, of which, as shown above, the Manila Electric Company accounted for 144,823,030 KWH, or nearly 70 percent. The balance, approximately 64,000,000 KWH, was produced mainly by the many small municipally and privately-owned diesel power plants scattered throughout the Islands. Hydro-electric plants were operated by the Philippine Power Development Company in Laguna and Batangas Provinces and the Mabalacat Hydro-Electric Company in Pampanga Province. The City of Baguio's plant was hydro-electric and small water-powered plants were also located at Tayabas, Tayabas Province, and Zamboanga, Zamboanga Province. Other plants were diesel-powered.

The 198 electric light and power companies in operation in 1938 were distributed among 46 of the 49 provinces, according to the Census. The three provinces without public utility power were Batanes and Zambales in Luzon and Bukidnon in Mindanao. The City of Manila, with the steam plant of the Manila Electric Power Company, and ten provinces (Abra, Antique, Bataan, Cotabato, Masbate, Nueva Vizcaya, Palawan, Romblon, Sulu, and Surigao) had only one plant each.

Mining companies, sawmills, sugar centrals and other industrial establishments produced electric power for their own use and, in some cases, furnished their officials and employees with electricity for their homes. In the case of sugar centrals, power was generated largely by steam plants using bagasse, by-product of sugar cane, for fuel. 2/ Rice mills were powered chiefly by diesel engines, kerosene,

1/ A list of plants of the Manila Electric Company, showing location, capacity and type of prime mover, is given in Appendix A.

2/ A list of government and private electric plants, other than the Manila Electric Company, showing location, capacity and type of prime mover, is given in Appendix B.

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and steam fired by rice husks. A few rice mills were still operated by water wheels of Spanish vintage. Lumber and sawmills, burning wood, were operated mainly by steam, but some diesel engines and kerosene were used. Cement factories were powered by diesel engines and steam from coal, while the mining industry employed mainly diesel power and some hydro-electric. The major portion of mining installations was in Mountain Province and the Camarines areas in Southern Luzon.

Installed capacity of industrial plants totaled approximately 260,000 HP in 1937, divided as follows:

Capacity of Industrial Plants

<u>Type of Plant or Industry</u>	<u>Capacity in HP</u>
Mining industry	62,740
Sugar centrals	91,490
Rice mills	42,090
Lumber and sawmills	36,765
Coconut oil mills	4,535
Cement factories	5,000
Miscellaneous 1/	18,940

261,560

5. Consumption of Electricity

At the end of 1938 there were 212,738 customers for the 208,665,890 KWH of electricity generated by the public utility companies operating under franchise from the Public Service Commission. Eighty-two percent, or 174,772, were reported by the Census as residential purchasers, 17 percent as commercial customers and 1 percent as industrial customers. The last named were concentrated in Cebu, Nueva Ecija and Mountain Province, while commercial customers were found chiefly in Pangasinan, Iloilo, and Negros Occidental, according to the Census statement. A total of 282,936 families, or 9 percent of all families in the Philippines, reported electricity as the kind of lighting used. The fact that some families obtained electricity from their private plants or from the plants of their employers accounts for the fact that the number of families using electricity is larger than the total number of customers. Of the families using electricity 87,450 were in Manila and 46,600 in Rizal Province, in which Manila is located. Cavite, Bulacan, Laguna, Cebu, and Negros Occidental were the only other provinces reporting more than 10,000 families using electricity.

1/ Ice plants, rope factories, canning, rubber shoe factories, starch plants, and the like.

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6. Transmission Lines

Transmission lines of electric light and power companies totaled 550 kilometers (342 miles) in 1938, classified as follows:

Transmission Lines	Kilometers	Miles
8,000 to 13,800 volts	370	230
16,000 to 23,000 "	92	57
66,000 to 115,000 "	88	55

The location of transmission lines, by voltage, is shown below:

Location	Voltage of Transmission Lines								
	8,000 to 13,000			16,000 to 23,000			66,000 to 115,000		
	Com-	Length of		Com-	Length of		Com-	Length of	
	panies	Km.	Miles	panies	Km.	Miles	panies	Km.	Miles
Rizal	1	90	56	-	-	-	1	46	29
City of Manila	1	23	14	-	-	-	-	-	-
Laguna	1	87	54	-	-	-	1	42	26
Cavite	1	45	28	-	-	-	-	-	-
Bulacan	1	37	24	-	-	-	-	-	-
Tayabas	1	28	17	-	-	-	-	-	-
Mountain	-	-	-	2	92	57	-	-	-
Cebu	1	60	37	-	-	-	-	-	-
Philippines	7	370	230	2	92	57	2	88	55

Transmission lines, supported by 333 transmission towers, for carrying power from the Government's plant at Caliraya over the 52 miles to Manila were completed before war came.

7. Power Equipment

The 1939 Census reported equipment used in the electric light and power industry in the following classifications:

	Percent Distribution		
	Number of Companies	No. of units of equipment	Rated Capacity
Diesel power	90.5	87.1	29.6
Semi-diesel	4.0	3.6	0.7
Hydro-electric ...	4.5	7.0	30.9
Steam engine	0.5	1.7	38.3
Gas engine	0.5	0.6	0.5
	100.0	100.0	100.0

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Nearly 80 percent of electric light and power companies had been in operation 15 years or more when the census was taken. The ratio of companies by age to total power production, assets and number of employees is shown below:

	Percent Distribution		
	Production	Total Assets	Employees
Under 3 Years	0.7	1.1	5.0
4 to 8 "	10.4	7.0	22.3
9 to 13 "	18.6	16.6	39.2
14 to 18 "	22.7	22.9	49.7
19 to 23 "	24.4	27.4	53.7
24 to 28 "	32.1	30.7	55.3

8. Revenues and Expenditures

The gross total income of all electric light and power companies in 1938 amounted to 13,242,280 pesos and expenses totaled 7,952,515 pesos, according to the Census findings. Sources of revenue and expenditure were reported as follows:

	<u>Income and Expenditure of</u> <u>Electric Light and Power Companies</u> <u>1938</u>	
	<u>Pesos</u>	<u>Dollars</u>
Gross Income:		
Total	13,242,280	6,621,140
Sale of power	13,133,160	6,566,580
Other sources	109,120	54,560
Expenses:		
Total	7,952,515	3,976,257
Operating	5,009,130	2,504,565
Maintenance	852,660	426,330
Depreciation & sinking fund	1,660,745	830,372
Other charges	429,980	214,990

9. Personnel and Labor

Employees of the electric light and power industry in 1938 were reported by the Census as follows:

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Employees of Electric Light and Power Industry
1938

Executives, superintendents, managers and supervisors	396
Office employees	510
Collectors, inspectors, etc.	578
Linemen, skilled laborers and plant employees	1,961
All others	143
Total	3,588

10. Light and Power Situation Under the Japanese

From Japanese broadcasts during the first half of 1942 it appeared that production of power for the Manila district was running considerably below capacity. Notwithstanding general stagnancy of industry and commerce, the military administration found it necessary to restrict the use of electric power, urging conservation wherever possible. Because of the lack of coal, formerly mainly imported, the steam plant of the Manila Electric Light Company was forced to use coconut oil as fuel, and after a time closed down entirely. Doubtless the seasonal falling off in hydro-electric production during the dry months also contributed to the shortage of power.

Meanwhile the Japanese proceeded with completion of the Philippine Government's plant at Caliraya. Following the fall of Manila military authorities retained American engineers to install machinery and operate the plant. In July 1942 Tokyo announced its completion. The American-owned Manila Electric Company also was taken over by the Japanese and operated by the Taiwan Electric Company. It is believed that practically all the executive personnel was retained.

There were no reports of destruction of utility power plants during hostilities with the exception of diesel plants at some of the gold mines — which were rendered temporarily useless before the Japanese arrived — and the Visayan Electric Company's plant at Cebu, wrecked by the USAFFE. To furnish light and power to the City of Cebu the Japanese used the power plant at the Cebu Portland Cement Company, burning the stock of coal on hand at the cement factory. Intermittent broadcasts have referred to the restoration or near completion of hydro-electric plants in various localities. In 1943 it was claimed that 36 waterpower plants were "built" (probably reconstructed or repaired) that year. In a statement in September 1943 concerning hydro-electric enterprise in the Philippines, however, Shozo Murata (chief Japanese adviser to the military administration) reported that the hydro-electric enterprise at Lake Lanao, Mindanao, ^{1/} was "not nearly so far advanced as a great hydro-electric project in Sumatra."

^{1/} Doubtless the Agus River site earlier referred to.

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The problem of fuel is probably the chief bottleneck in the generation of power under the Japanese, as gasoline, diesel oil and most of the coal formerly used were imported. Early in 1943 it was stated that owing to the restoration of the chief hydro-electric power plants, "steam and electric generators can now rest whenever necessary to enable economizing of fuels." While the Japanese have claimed increased production of coal in Mindanao, which "is expected to supply power for certain Philippine industries," the serious shipping shortage would seem to preclude the transport of any large amount of coal to Luzon even if it were mined. Rice and sugar industries may be expected to burn rice husks and bagasse (dried sugar cane) more generally, while greater production of alcohol from sugar, and the use of coconut oil and charcoal as fuel may partially solve the difficulty. Reports indicate that charcoal is being made from mangrove lumber and coconut shells, both abundant in the Philippines.

The constitution of the Philippine Republic, as established by the Japanese in October 1943, empowered the puppet President to enter into agreements with foreign nations for the utilization of natural resources and the operation of public utilities in the Philippines, such agreements to expire upon termination of the Greater East Asia war. Thus for the duration of the war, at least, Philippine public utilities may be placed at the disposal of Japan. Information regarding agreements that may have been made is not available.

B. Gas Plants

1. The Manila Gas Company

The only gas plant in the Philippines before the war was the Manila Gas Company, located in the industrial center south of the Pasig River, Manila, near cordage, coconut oil and tobacco factories. The plant, originally built by German and Swiss capital, was acquired by American interests in 1928, but the former German manager, Arthur Hoyer, and other German personnel were retained. In August 1941 it was reported that a number of Germans in the company's employ had been replaced, with the former German manager functioning in advisory capacity only. 1/

The plant burned imported coal and supplied gas for home cooking and lighting and for commercial users in Manila and nearby municipalities. The United States Army and the Philippine Government also were important customers of the company.

1/ "Philippines," August 1941, published by the Department of Information and Public Relations, Commonwealth of the Philippines, Washington, D. C.

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In 1937 a Federated Gas Corporation was organized with a view to establishing gas companies in the cities of Baguio, Cebu and Iloilo. The well-known Filipino promoter, Adres Camasura, in association with Pedro Guevara and R. T. Romero, became active in the Baguio and Cebu plans, while E. E. Tobes headed the Iloilo company. All three projects appear to have lacked sound backing, and the application of the Iloilo Gas Company was denied by the Public Service Commission on the ground that it had not proven financial capacity to operate a public utility.

2. Japanese Occupation

Early in 1942 Japanese broadcasts indicated that the German manager of the Manila Gas Company was again in charge, and about a year later it was announced that gas was being supplied Manila by the "Taiwan Gas Company."

Coal stocks of the Manila Gas Company were damaged by fire caused by burning oil on the Pasig River when oil tanks were drained by United States forces late in December. For four days the plant was run by burning new Chinese money, printed in the United States for the Chungking Government and discharged in Manila during aerial bombardment of the city. American officials in charge of the shipment took this means of preventing its fall into Japanese hands. Since that time it is believed the plant has used charcoal and coconut oil for fuel, owing to the scarcity of coal.

C. Water Works and Supply

1. Metropolitan Water District, Manila

Manila and fifteen surrounding municipalities were supplied with water before the war through facilities of the government-controlled Metropolitan Water District. The main source of supply was the Angat River, on which about 30 miles north of Manila a watershed area of 6,200 acres, had a storage capacity of six billion gallons of water, or approximately six months' supply for the district at the consumption rate of around thirty million gallons a day. An aqueduct carried the water to the Balara filter plant, about 3 miles northeast of Manila in Quezon City, and to the San Juan reservoir just north of Manila. The Balara filtration plant was of the rapid sand or mechanical filter type, with capacity of 50 million gallons a day.

Within Manila's city limits, water was distributed through pipe lines ranging in diameter from 4 inches to the 42-inch main line pipes. One-half inch galvanized iron piping carried water to individual residences.

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General statistics covering operations of the Metropolitan Water District in 1938 are shown below:

The Metropolitan Water District - 1938

Number of services	44,197
Number of fire hydrants	1,097
Number of public hydrants	292
Gallons of water used per day	38,340,300
Feet of water main	1,275,000

2. Areas Outside Manila

In 1938 there were 368 municipal public water supply systems throughout the provinces (in addition to the Metropolitan Water District), furnishing water to about 1,660,000 people. Excellent systems existed in Baguio, Cebu and Zamboanga. Outside the more populated centers, however, healthful drinking water is difficult to obtain in the Philippines because of stream pollution. Most of the potable water in the provinces comes from artesian wells. 1/ In 1938 there were approximately 3,000 drilled wells in operation at population centers, with nearly two-thirds on the island of Luzon. Surface wells, used to some extent to supplement artesian, as a rule are community property and susceptible to contamination. In a few areas where natural watersheds are available, rain water is the main source of supply. Although usually in sparsely-populated areas with slight opportunity for contamination, such water is generally chlorinated before use.

The Philippine Census of 1939 reported the sources of water supply for a total of 3,143,886 families as shown below:

Source of Water Supply

	<u>Families Reporting</u>	<u>Percent</u>
Water pipe system	402,373	12.8
Artesian well	454,952	14.5
Surface well	1,680,777	53.5
Rain water tank	271,389	8.6
Other sources & sources not reported	<u>334,395</u>	<u>10.6</u>
Total families	3,143,886	100.0

1/ It is authoritatively stated, however, that all water outside of Manila should be boiled or chemically treated, since even the artesian wells may be subject to seepage and pollution from unsanitary surroundings.

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Of the 402,373 families serviced with water pipe systems, 107,869 were in Manila and 37,062 in Rizal Province in which Manila is located. The greatest number of artesian well users were in Pangasinan, Pampanga, Cebu, Bulacan, and Rizal provinces.

3. Purification Facilities

The Manila water supply system was equipped with an excellent purification plant, complete with reservoirs, sand filters, and facilities for chlorination. In some sections of the city, however, regular city water was not obtainable, and artesian and surface wells were used.

4. Water Supply Under the Japanese

Manila's water supply was not impaired during hostilities, and while detailed data are lacking regarding the present situation throughout the country, reliable sources indicate that in Manila, at least, pre-war standards were maintained during 1942 and 1943.

In connection with steps toward national defense, Manila broadcasts announced in March 1944 that 76 artesian wells in the city and suburbs had been reconditioned to insure a public supply of water in the event of a shortage during possible air raids. It was stated that work was progressing on the reconditioning of other wells.

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II. DOCKS, HARBORS, AND AIDS TO NAVIGATION 1/

A. Ownership and Administration

Philippine ports of entry were classified by Executive Order of March 13, 1929 as national and municipal. National ports were those of primary importance to foreign, inter-island and inter-provincial commerce, and ports which, on account of their location, were necessary for enforcing customs regulations or for national defense. All ports not classified as national were municipal ports.

Maintenance and improvement of national ports were financed by the Commonwealth Government, and their administration and operation was under the direct supervision and control of the Insular Collector of Customs, Bureau of Customs. The enforcement of customs laws and regulations, protection and collection of customs revenues and charges, and control over all port facilities were functions of the Customs Bureau, as were also pilotage regulations and charges, and the entrances and clearances of vessels. For administrative purposes the Commonwealth was divided into nine Customs Collection Districts corresponding to the principal ports of entry: Manila, Legaspi, Aparri and Jose Panganiban in Luzon; and Iloilo, Cebu, Davao, Zamboanga, and Jolo in the southern islands.

Maintenance of municipal ports was financed by the municipalities concerned, and by appropriations authorized by the Commonwealth Government, such work being carried out with the advice and under the general supervision of the Director of Public Works. Administration and operation of municipal ports was the responsibility of municipal councils concerned, subject to general regulations of the Insular Collector of Customs.

Harbors, piers and wharves, and the mechanical equipment installed on piers and wharves at ports of entry, available for the berthing and use of commercial vessels, were owned, administered and controlled by the Bureau of Public Works, Commonwealth Government. Funds for the maintenance of ports and lighthouses were obtained from a wharfrage tax on most Philippine exports.

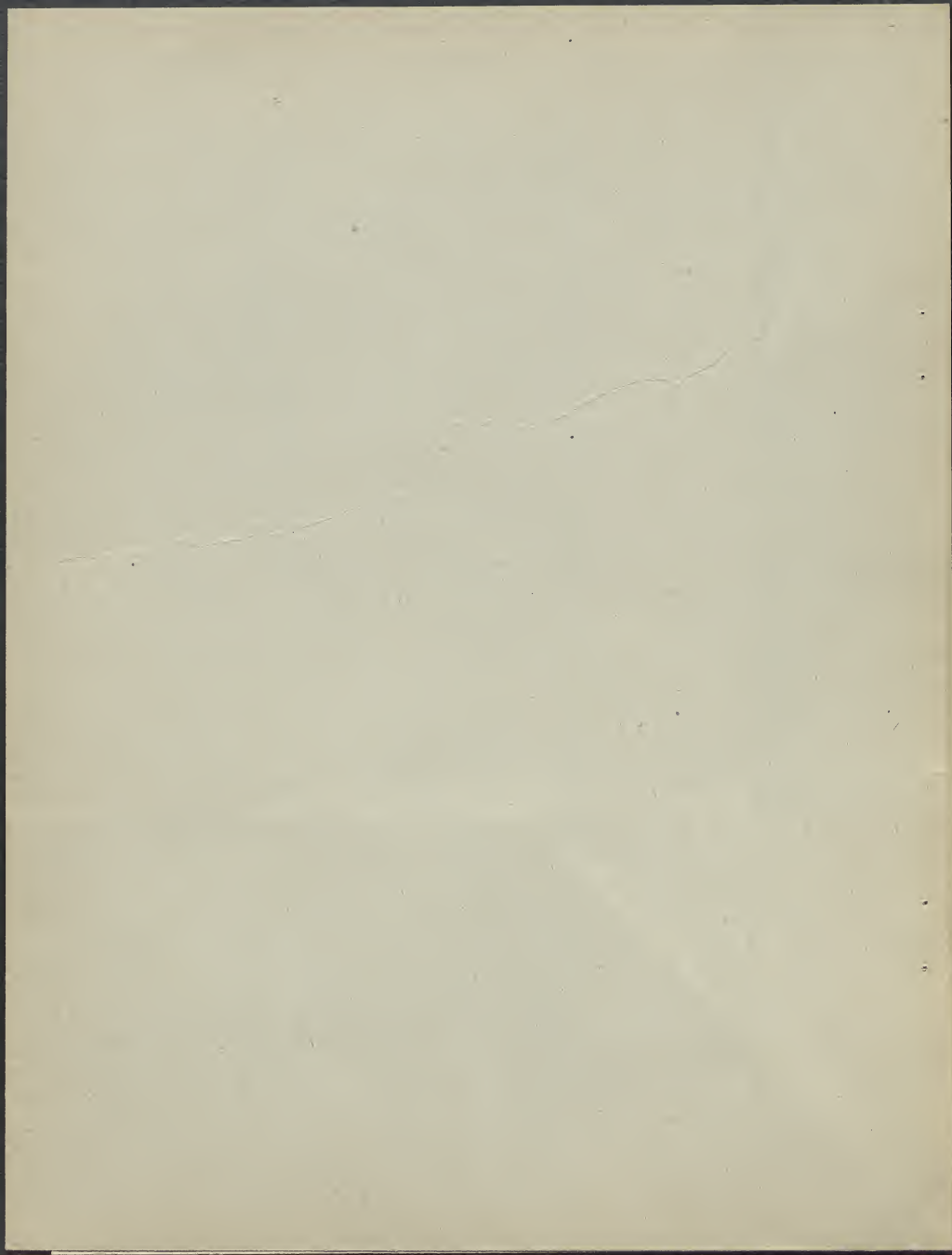
B. National Ports Open to Overseas Shipping

Of the 64 ports designated by the Philippine Government as national, the following 15 were open to overseas shipping:

1/ Information in this chapter is largely from the United States Coast Pilot, Philippine Islands, Third Edition, 1939, Coast and Geodetic Survey, Department of Commerce, Washington, D. C. The Pilot should be consulted for further details relative to port and harbor facilities, hydrographic data, etc., existing before the war.

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Ports Open to Overseas Shipping

<u>Port</u>	<u>Province</u>	<u>Island</u>
Manila	Rizal	Luzon
Iloilo	Iloilo	Panay
Cebu	Cebu	Cebu
Davao	Davao	Mindanao
Legaspi	Albay	Luzon
Jose Panganiban	Camarines Norte	"
Zamboanga	Zamboanga	Mindanao
Jolo	Sulu	Sulu Archipelago
Aparri	Cagayan	Luzon
Hondagua	Tayabas	"
Tabaco	Albay	"
Pulupandan	Negros Occidental	Negros
Malangas	Zamboanga	Mindanao
Siasi	Sulu	Sulu Archipelago
Batobato	"	" "

1. Manila

Capital of the Philippines, Manila is the chief port and center of all business and trade activity. In 1940 export trade passing through the port was valued at \$71,250,000 or 45 percent of all exports, while import trade handled at the port, valued at \$120,150,000, amounted to nearly 90 percent of total imports into the country. Pre-war Manila was connected by regular shipping schedules with over 60 other ports in the Philippines, from the Batan Islands north of Luzon to the Sulu Archipelago in the extreme south.

The inner harbor is on the eastern shore of Manila Bay, about 30 miles from the entrance to the Bay on the western coast of Central Luzon. The harbor forms a quadrangular section of Manila Bay protected by a stone breakwater enclosing an area of 2 square miles. An additional breakwater section has been extended offshore from the beach south of Fort San Antonio Abad. Continued dredging is necessary to provide a depth of 3 1/2 feet in the deep-water anchorage area and channel to the piers. Wharf accommodations are adequate for vessels of the largest class, and there are a number of mooring buoys belonging to the Government and to various steamship lines. Between the north end of the harbor and the nine-foot canal leading into the Pasig River — which flows through the city connecting Manila Bay with the large lake Laguna de Bay south of Manila — is a basin about 300 yards square for small craft. In this basin are two marine railways, the Government's on Engineer Island and the marine railway of the Earnshaws Docks and Honolulu Iron Works.

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North of the Pasig River construction was under way when war came on Manila North Harbor, planned for inter-island boats.

Piers and Wharf. - The port of Manila before the war maintained three piers and one bulkhead wharf for commercial vessels. One federal pier was operated by the United States Government for the exclusive use of Army and Navy vessels. Concrete aprons outside the cargo sheds provided excellent cargo-handling space. Overhead traveling hoists, motor trucks with lifting cranes, electric floor tractors, motor trucks and trailers, and hand trucks permitted efficient handling of cargo. Pipe connections were available for fresh water and fuel oil.

Pier No. 1: United States Government pier. 550 x 60 feet; covered by steel cargo shed.

Pier No. 3: 680 x 120 feet; covered by steel cargo shed 60 feet wide, leaving aprons 30 feet wide on each side and 80 feet wide at end. Within cargo shed are 10 electric monorail hoists of 1-ton capacity.

Pier No. 5: 730 x 160 feet; covered by steel cargo shed 100 feet wide, leaving aprons 30 feet wide on each side and 80 feet wide at end. Within cargo shed were 6 electric overhead monorail hoists of 1-ton capacity.

Pier No. 7: One of the finest ocean piers in existence; 1,400 x 240 feet, with berthing length of 1,290 feet. Covered by modern concrete and steel cargo and passenger structure, 1,235 feet long and 160 feet wide, leaving aprons 40 feet wide on sides and end. Capable of accommodating 4 of largest vessels plying the Pacific before the war; fifth vessel could be berthed at end.

Modern mechanical cargo-handling equipment included 6 electric heavy lift Gantry cranes of 4 and 15 tons capacity, mounted upon trackage on the aprons. Within the cargo structure was a flexible system of 23 overhead electrical hoisting and stacking cranes, moving both longitudinally and laterally; of 2 and $3\frac{1}{2}$ -ton capacity.

Wharf "B": Used for berthing vessels of light draft; 750 x 100 feet; covered by steel cargo shed 85 feet wide, leaving 15-foot apron at front. A bulkhead wharf, it connects piers 3 and 5.

Other: Several private and public landings for tenders and launches in Manila harbor.

Loading and Unloading Facilities. - Privately owned and operated floating derricks were available for heavy lifts up to 50 tons. There were no rail facilities in direct connection with the piers; cargo was

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transported to and from the piers by motor trucks and river lighterage. Trackage of the Manila Railroad Company, however, paralleled the wharves on the Pasig River, where inter-island vessels berthed. Privately-owned lighterage facilities of all kinds were available for all classes of cargo.

Bonded warehouse space was provided by two customs general bonded warehouses and one private general warehouse situated in the port area near the piers. Nine private bonded warehouses were located in the city. The government-owned Manila Railroad maintained and operated the Terminal Bonded Warehouse recently completed opposite Pier 7.

In 1937 the arrastre service of the government piers at Manila — i.e., the handling of cargo on the dock and loading it on transportation trucks — was placed under control of the Manila Railroad Company, which was bonded to the Philippine Government in the amount of 100,000 pesos (\$50,000) as a guarantee that the Manila Port Terminal would efficiently perform all its duties as arrastre contractor. The railway was given exclusive use of the government piers and government cargo-handling equipment for the receiving, handling, custody and delivery of all merchandise, import and export, which passed through those piers. One-half of all net profits realized from the operation of this business was paid to the Bureau of Customs.

As trans-oceanic shipping space became scarce during 1940 and 1941, and the time element urgent, ship operators no longer sent their vessels to the smaller loading ports in the Philippines, and the resulting necessity for almost all cargo to be brought to Manila — also the destination of most incoming cargo — placed a heavy strain on stowage, warehouse and loading facilities at Manila piers. In his annual report for the fiscal year ended June 30, 1940, the Insular Collector of Customs recommended that Piers 3 and 5 be enlarged to twice their size, and furnished with up-to-date cargo-handling equipment similar to that in Pier 7, and that a bulkhead for Pier 7 be started with minimum delay.

Bunkering. - Before the war an unlimited supply of bunker coal could be had at Manila. Coal was usually delivered alongside in lighters. Bunker fuel oil was furnished by lighter or pipe-line connections at the piers, and bulk diesel oil and gasoline were delivered in drums by lighters. Lubricating oils were furnished in tins or in drums. Bunkering facilities were located chiefly on the north bank of the Pasig River.

Repairs. - Foundries in Manila were equipped to handle castings up to 15 tons and the equipment and capacity of shops in Manila were sufficient for general repair work for all kinds of machinery. A government marine railway and repair plant were located on Engineer Island, the small artificial island forming the south side of the entrance to the Pasig River. The railway, according to the United States Coast

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Pilot for the Philippine Islands, could haul out a vessel 240 feet in length, 1,400 tons deadweight, with draft of 10 feet forward and 14 feet aft, at high tide. A smaller railway with cradle 108 feet long was capable of hauling out vessels of 100 tons, maximum draft 5 feet forward, 8 feet aft.

The slipway of the Earnshaws Docks and Honolulu Iron Works, located east of Engineer Island and south of the Pasig, had two cradles each 200 feet long and capable together of taking a ship of 2,000 tons deadweight. The maximum draft hauled out by the upper railway was 6 feet forward, 14 feet aft, and the lower railway 12 feet forward and 18 feet aft. Bunkering and repair facilities of the Atlantic Gulf and Pacific Company were located on the north bank of the Pasig River near its mouth.

The marine railway of the Varadero de Manila at Canacao, Cavite, had a length capacity of 300 feet, 3,000 tons deadweight, and draft forward of 7 feet 8 inches and aft, 19 feet 9 inches.

The Varadero de San Miguel and the Philippine Slipways and Engineering Company had two small marine railways located on the north bank of the Pasig River between the Colgante and Ayala Bridges. They were capable of hauling out vessels which could pass under the bridges. The length of the larger railway was 150 feet, with capacity of 200 tons, 6 feet draft.

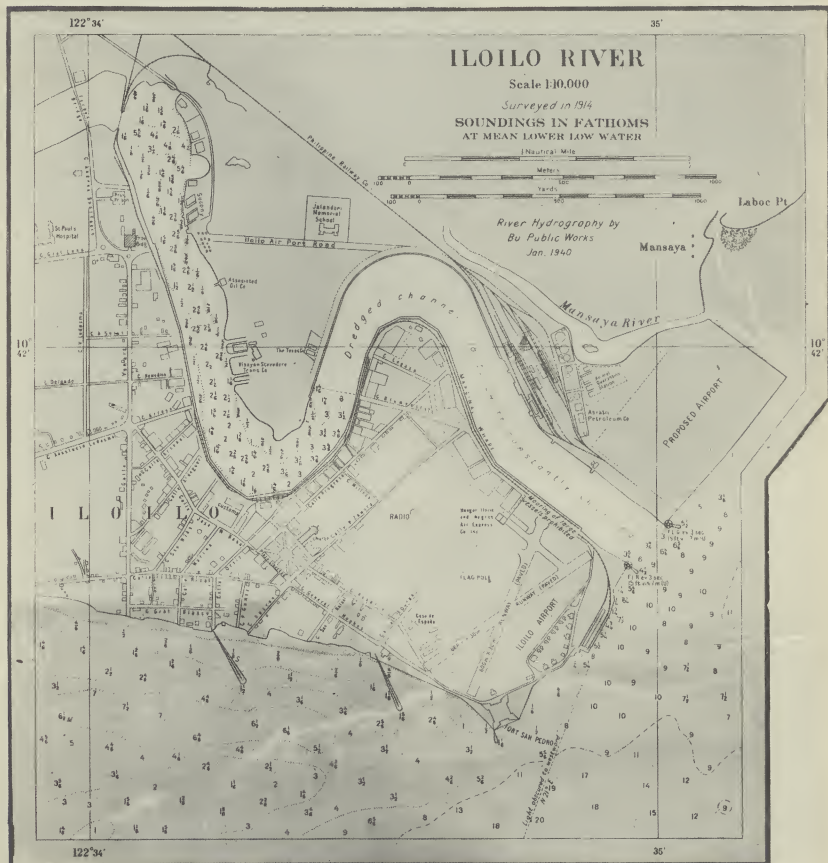
The United States Navy maintained a floating dry dock at Olongapo, on Subic Bay 50 miles north of Manila. The dock, designed for a 16,000-ton ship, was 500 feet long and approximately 100 feet between galleries.

2. Iloilo

Iloilo stands on a low sandy flat at the mouth of Iloilo River on the southeastern coast of Panay Island. Capital of Iloilo Province and southern terminus of the Philippine Railway, it was the leading port of shipment for sugar before the war. The wharf on Guimaras Strait afforded berth 525 feet long with depth of 30 feet alongside at mean low water. There was a cargo shed but no mechanical cargo handling equipment. The marginal wharf, where inter-island vessels berthed, extended along the southern bank of the river from the entrance to Forbes Bridge. Tracks of the Philippine Railway paralleled the marginal wharf and vessels loaded directly from the cars. The wharf at the railway terminal on the river's northern bank was equipped with a crane capable of lifting 15 tons. Tugs and lighters of all descriptions were based at Iloilo.

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Bunkering. - Bulk Diesel oil and bunker fuel oil was supplied in quantity by pipe line connections from the railroad pier. Tank trucks supplied vessels at the wharves and lighters served vessels at anchorage. Gasoline, kerosene and lubricating oils were stocked in tins. Supplies of 100 and 300 tons of coal were maintained by two commercial firms, respectively, and the Philippine Railway stored from 1,000 to 1,500 tons for its own use.

Repairs. - Machine shops in Iloilo were capable of making all ordinary repairs. A marine railway, with cradle 155 feet, could haul out vessels of 450 gross tons, maximum draft 10 feet forward, 15 feet aft. A crane barge capable of lifting 20 tons, salvage equipment, and tugs with pumping equipment were available.

3. Cebu

Cebu, capital of Cebu province and principal pre-war port of shipment for copra, is near the center of the eastern side of the island of the same name in the Visayans. It is connected by railway with Davao northward about 20 miles and with Argao to the south about 40 miles. The harbor of Cebu, one of the finest in the Philippines, is formed by the strait between Cebu and the small adjacent island of Mactan. The northeastern channel has a least navigable width of 220 yards and the southern approach is about one-half mile at the narrowest point. Off the town the harbor has a width of from 500 to 650 yards. Holding ground is good in most parts of the harbor.

Pre-war berthing space consisted of 5,413 lineal feet of marginal wharves and three piers. Piers 1 and 2 were equipped with cargo sheds. Berths along the marginal wharf were numbered from 1 to 9, beginning at the extreme west, with berths numbered 4, 5, 6, and 7 assigned to vessels of larger tonnage and the remainder to coastwise vessels. In January 1938 depths at the various berths and piers were as follows:

<u>Berth</u>	<u>Feet</u>	<u>Pier</u>	<u>Feet</u>
1	12	1	26
2	18	2	19
3	22	3	14
4	26		
5	25		
6	26		
7	22		
8	18		
9	12		

Depths at the wharves in Cebu Harbor were reported in July 1937 as shown below.

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<u>Wharves</u>	<u>Feet</u>
Asiatic Petroleum Company	25
Texas Oil Company	25
Standard Oil Company	27
Port of Opon	20
Philippine Refining Company	29

Towboats. - Tugs and lighters were available at Cebu and the Philippine Bureau of Public Works maintained a derrick barge capable of lifting 5 tons.

Bunkering. - Bulk bunker fuel and Diesel oils could be secured in quantity, vessels being served usually by lighter. Some gasoline was stored in bulk but the greater amount was supplied in tins. Kerosene and lubricating oils were plentiful, and a coal storage of 1,000 tons was maintained.

Repairs. - A number of machine shops were available for ordinary repairs. The marine railway and machine shop at Opon, Mactan Island, was well equipped to handle all kinds of repair work. Dimensions of the four slipways were as follows:

Marine Railways, Opon

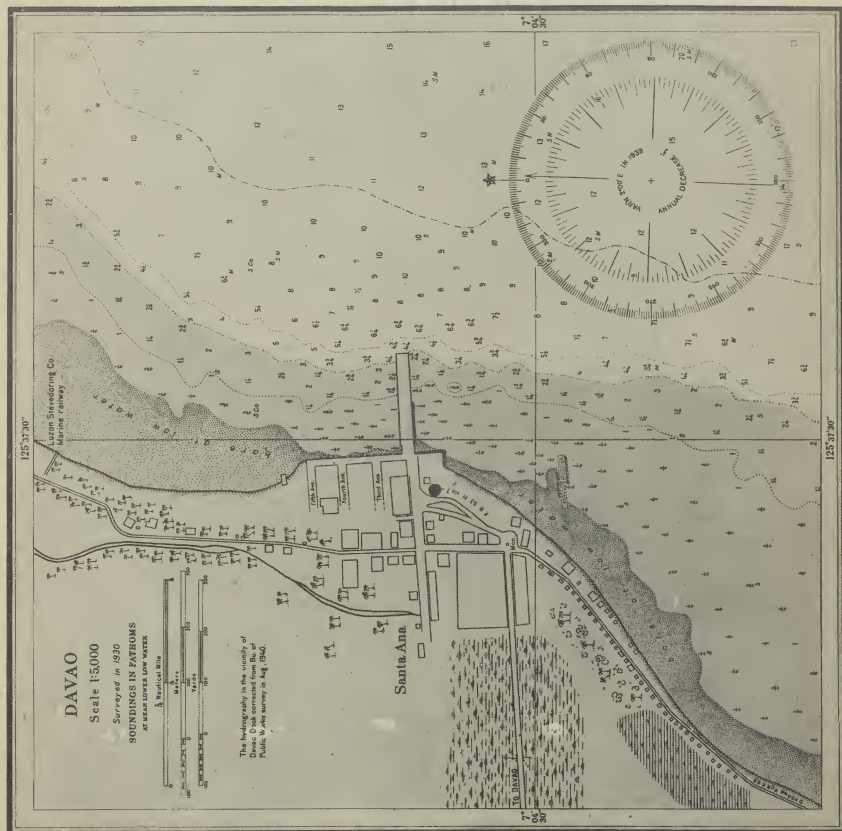
		<u>Slipway number</u>			
		<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>
Length of cradle	Feet	200	150	135	120
Width of cradle	"	35	22	21	16
Max. draft forward	"	9 $\frac{1}{4}$	8	4	2- $\frac{3}{4}$
Max. draft aft	"	19 $\frac{1}{4}$	17	11 $\frac{1}{2}$	9 $\frac{1}{2}$
Max. gross tonnage	Tons	1,300	700	400	280

4. Davao

Capital of Davao province, Davao City is the chief commercial center of southern Mindanao. Before the war it was the principal Philippine port for shipment of abaca, while copra and lumber were exported in considerable quantities. The port area is in the barrio of Santa Ana, on the north bank of Davao river about 1 mile from its mouth. The single government pier was of reinforced concrete, about 330 feet long and 50 feet wide, and connected to the shore by a causeway. In July 1938 depths alongside the wharf were very irregular, approximately as follows: pier end, 27 feet; north face 29 to 11 feet; south face, 26 to 5 feet. A survey in January 1939 showed 25 feet at end of wharf. Interisland vessels berthed alongside the northern face, but foreign vessels usually anchored offshore, loading from lighters.

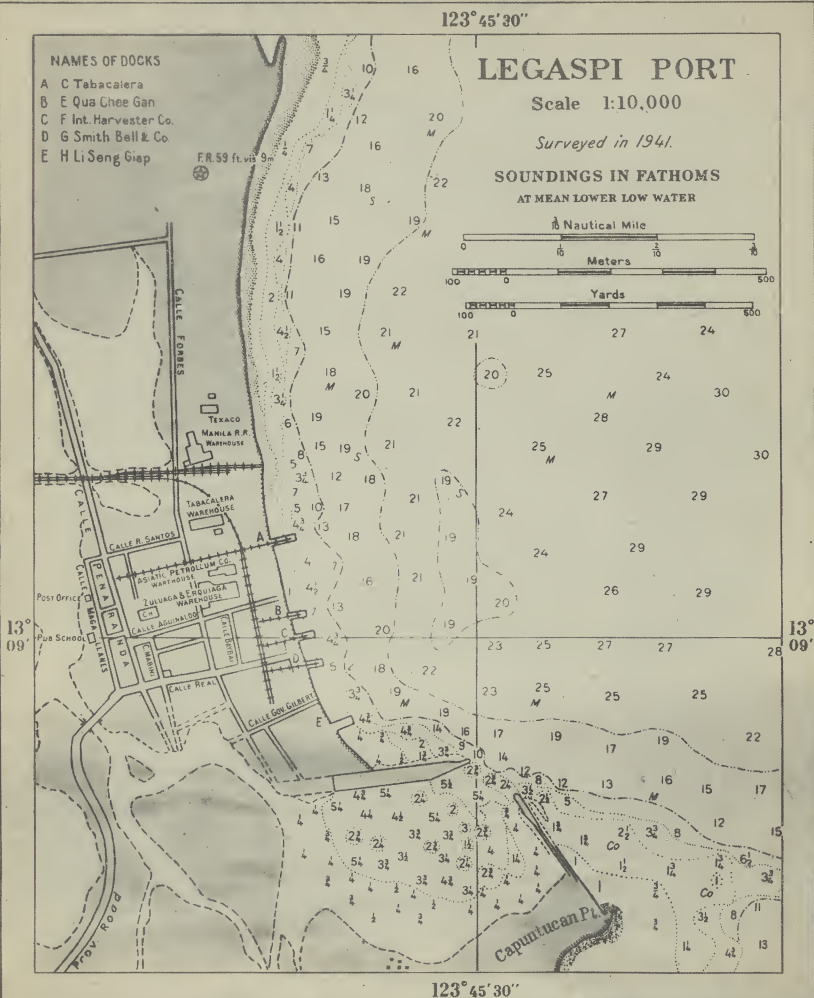
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There was no equipment on the pier or at Davao for heavy lifts, and loading was done by ship's tackle. A small fleet of lighters and towing launches included two seagoing tugs and 13 lighters for the transfer of cargo, but there were no lighters for the handling of bulk liquid.

Bunkering. - Coal and bunker fuel oil were not available, but gasoline, Diesel oil and lubricating oils could be secured in large quantities in tins and drums. The Asiatic Petroleum Company, with storage tank and wharf located on Lanang Point on the west side of Pakiputan Strait, about 3½ miles northeast of Davao, supplied Diesel oil and gasoline in bulk through pipe lines to shipside. Large vessels could lie alongside the company's dock.

Repairs. - Minor repairs only were possible. There was one machine shop in the town, and welding and casting equipment was available. A private marine railway was designed only for hauling out small launches or lighters of not over 4 feet draft and 40 feet length.

5. Legaspi

Located at the head of Albay Gulf, Legaspi is the principal seaport in eastern Luzon. It is the southern terminus of the Manila Railroad, and before the war was a regular port of call for inter-island vessels from Manila and Cebu, as well as for foreign freighters. Copra and abaca were the chief exports. There were five docks of light construction with from 24 to 30 feet at their ends. The Commonwealth Government was actively engaged in port improvements by the construction of a sheltered basin northwestward of Capuntucan Point. Breakwaters and a concrete marginal wharf had been completed, and the enclosed basin, which had an entrance 120 yards wide, was being dredged to a depth of 33 feet. In May 1938 the wharf had a depth of 14 feet alongside and afforded berth for one small vessel at its outer end. There was no mechanical loading and unloading equipment. Cargo was passed to and from the ship by hand over a stage rigged from wharf to ship.

Legaspi was a distributing center for gasoline, Diesel oil, lubricating oils, and kerosene, all of which could be obtained in quantity in tins or drums, and a small supply of aviation gasoline was formerly stocked at the port. Welding could be done at a small machine shop in the town.

6. Jose Panganiban (formerly Mambulao)

The harbor of port Jose Panganiban — on the northern coast of Camarines Norte, southeastern Luzon — is nearly 2 miles wide at the entrance between Calambayanga Island and Pinandungan Point and extends 3½ miles southeastward. The port is clear, easy of access, and affords a large area of good anchorage in any depth desired. It cannot, however,

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be recommended as a typhoon shelter, for considerable swell rolls in with northwesterly winds. Foreign vessels from Manila called frequently before the war, and there were weekly sailings to Hondagua, copra center in southern Luzon. All water-borne traffic to and from the Paracale mining area passed through Jose Panganiban. The port was by far the chief point of shipment for iron ore in the Philippines.

The landing, located about two miles northwest of the town, accommodated small launches at high tide. Lighters were available for the use of larger vessels. In May 1938 the depth alongside was 23 feet. One of the mining companies maintained a series of pile clusters immediately north of the pier and ships calling with fuel oil discharged through a pipe-line connection. Depths varied from 24 feet at the southeastern cluster to 30 feet at the northwestern cluster. Diesel oil storage tanks on the shore had a combined capacity of over 800,000 gallons.

7. Zamboanga

Zamboanga, principal city of Mindanao and capital of Zamboanga Province, is situated on the southwestern extremity of the peninsula which forms the province. It was the pre-war center of trade for the southwest section of Mindanao and northern portion of the Sulu Archipelago. Copra, desiccated coconut and timber were the chief exports.

There was one reinforced concrete wharf with a "T" end, the face of the "T" being about 800 feet long with a depth alongside in March 1938 of 30 feet at the western end. A concrete small-boat landing 148 feet long, with depth of 10 feet alongside the southern face, extended from the eastern side of the causeway. A commercial towing company operated four light towing launches and two small seagoing tugs. Lighters of 50 to 100 tons capacity (6 seagoing and 4 harbor) were sometimes available. There was no equipment for handling heavy lifts.

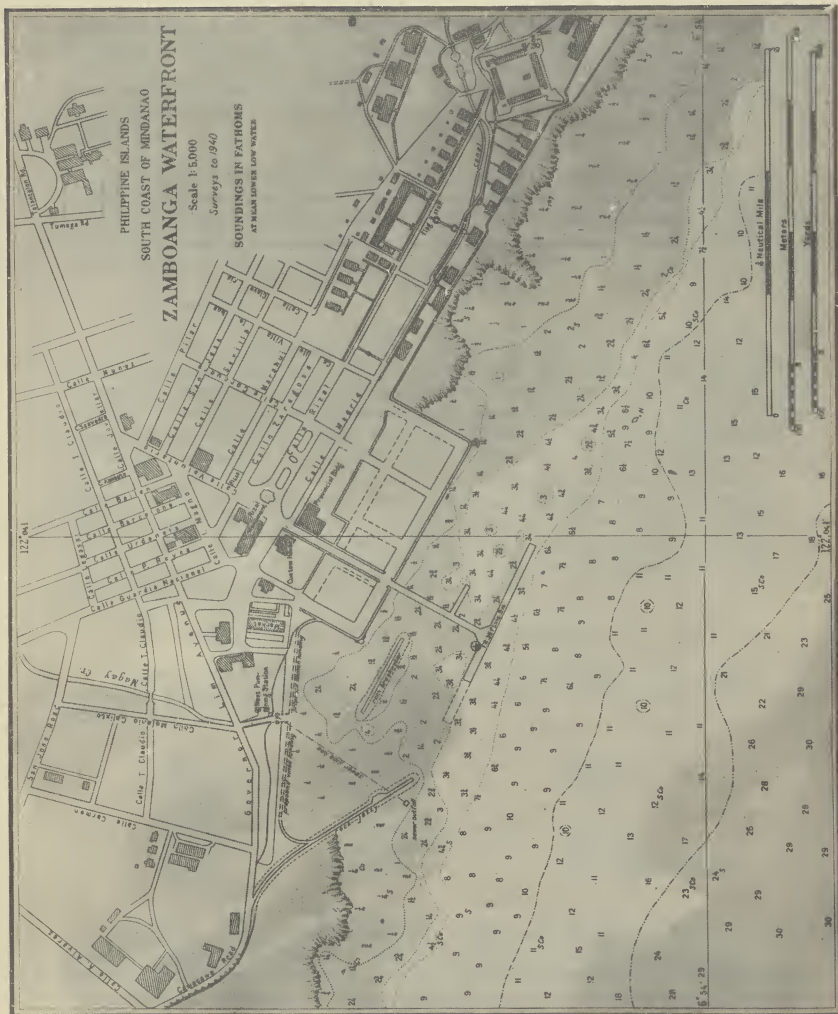
Repairs. - Facilities for repairs were limited to a machine shop in Zamboanga City and two small marine railways capable of docking tug boats and launches. The railway at Zamboanga could haul out a vessel of 50 tons, 100 feet length and 9 feet draft. The railway in Caldera Bay handled vessels of 50 tons, 90 feet in length, and 8 feet draft. No machine work was possible at either yard.

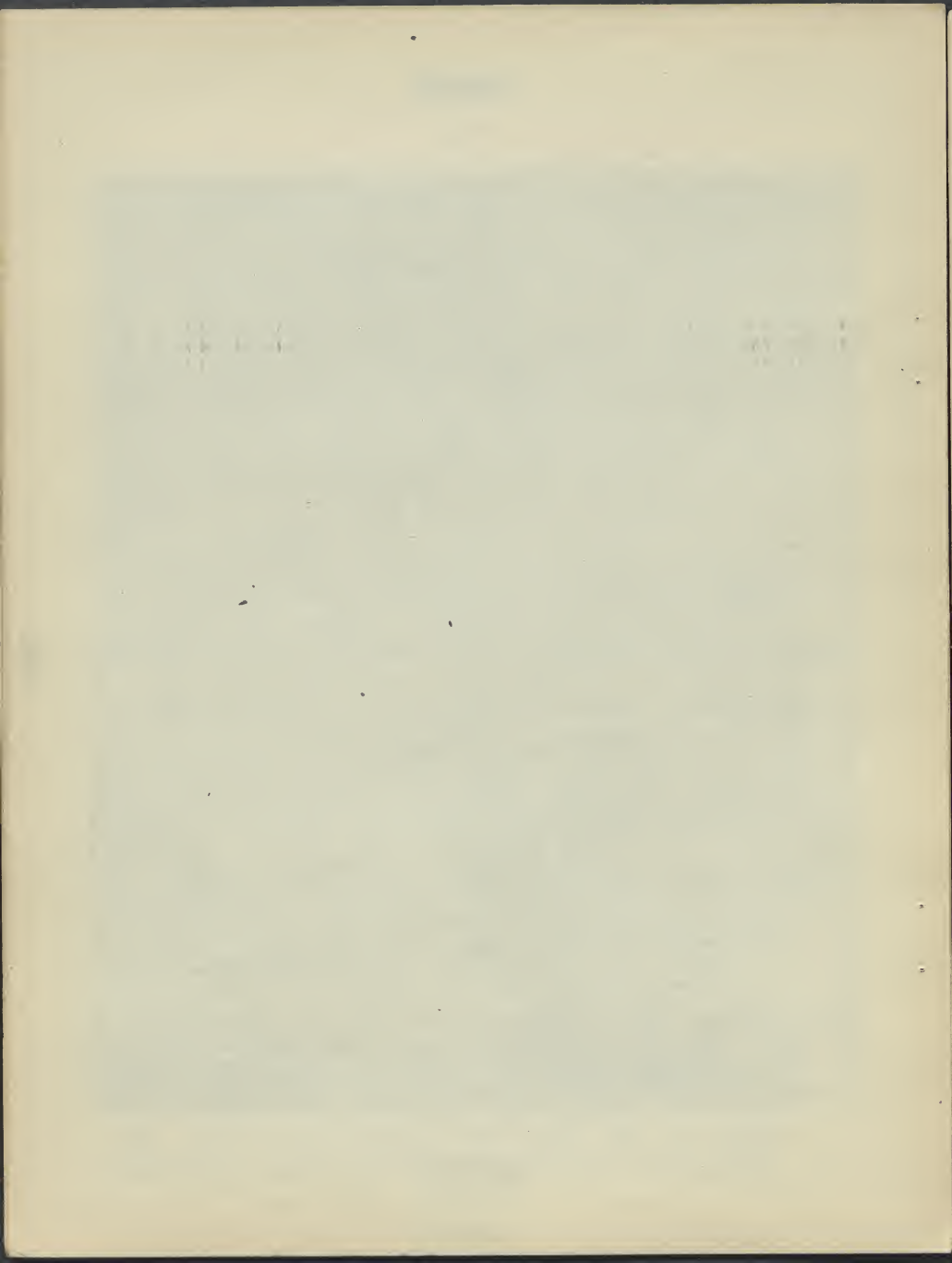
8. Jolo

Jolo, capital of Sulu Province and chief port in the Sulu Archipelago, is situated in a bight in the northern coast of Jolo Island. Before the war a concrete pier about 200 feet long and 40 feet wide was connected with the shore by a stone causeway about 650 feet long. The pier provided berthing space 280 feet long on its seaward face, 245 feet on the northeastern face, and 162 feet on the southwestern face, completed only shortly before the war. In June 1938

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the controlling depth outside the fender piles along the outer face was 30 feet and along the northeastern face depths varied from 27 to 12 feet. There was a cargo shed on the pier, and warehouses for storage of cargo were available nearby. A few tram cars were used to transport cargo to the Customs warehouse, but other cargo handling equipment was not available.

Gasoline, Diesel oil, and lubricating oil could be secured in small quantities in drums. There was a machine shop in the town of Jolo where minor repairs could be made, and a small marine railway, capable of handling launches up to 50 feet in length and 5 feet draft, was situated a short distance north of the pier.

9. Aparri

The principal port in northern Luzon is Aparri, located on the eastern side of the mouth of the Cagayan River. Through it passed the foreign water-borne trade of the Cagayan valley before the war, tobacco and lumber being the chief exports. Aparri harbor was defined as that portion of the Cagayan River between the barrio of Camalaniugan and the sea. Pilotage for the port was compulsory. Vessels anchored outside the river bar in 10 or 12 fathoms and unloaded and loaded by lighters. Vessels with draft not exceeding 14 feet could cross the river bar and enter the mouth of the Cagayan. A jetty on the east side of the river mouth served as berthing place. Gasoline, Diesel oil and kerosene were obtainable in drums in the pre-war days, but most marine supplies at Aparri were limited.

10. Minor Ports Open to Overseas Shipping

Other ports and harbors open to overseas shipping, but used generally before the war for interisland vessels, are shown below with summary data relative to facilities.

Port	Province	Island
Hondagua	Tayabas	Luzon
Tabaco	Albay	"
Pulupandan	Negros Occidental	Negros
Malangas	Zamboanga	Mindanao
Siasi	Sulu	Sulu Archipelago
Batobato	"	"

Hondagua. - A secure anchorage, with good holding ground, in the northeast part of Lopez Bay. Wharf, built by the Manila Railroad Company, with depths of from 30 to 15 feet alongside, and crane of 10 tons capacity. Stocks of coal, bunker fuel oil, and Diesel oil maintained by the railroad company for its own use.

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Tabaco. - West side of Tabaco Bay about 3 miles southwest of San Miguel Point. Concrete government pier with berth sufficient length for one large ocean-going freighter. Depth (1939) 30 feet at end. Oils available in town and by truck from Legaspi. Tabaco of considerable commercial importance, especially for shipment of abaca.

Pulupandan. - South side Pandan Point, northwestern coast Negros Island. Concrete pier with depths 24 to 29 feet alongside at low water (1938). Constant shoaling. Railroad tracks on pier. Ferry twice daily to Iloilo. Ocean-going vessels called during sugar milling season, and most of cargo to and from Bacolod (capital Occidental Negros) passed through Pulupandan.

Malangas. - L-shaped concrete pier 160 feet long with depth of 27 feet alongside, constructed in 1941. Malangas, on Dumanquilas Bay, southern coast of Zamboanga, is near government coal reservations.

Siasi. - West coast of island of Siasi in Sulu Archipelago, facing channel between Siasi and Lapac Island. Small government wharf with 47 foot face and depth (June 1937) of 20 feet. Vessels anchor in midchannel southwest of wharf in 6 to 10 fathoms. No fuel available.

Batobato. - Southern coast of Tawitawi Island, Sulu Archipelago. Data relative to wharf not available.

C. National Ports Open to Coastwise Trade Only

Ports designated by the Philippine Government as national ports but open to coastwise and interisland trade only were the following:

Ports Open to Coastwise Shipping

<u>Port</u>	<u>Province</u>	<u>Island</u>
Basco	Batanes	Batanes
Contra Costa	"	"
Currimao	Ilocos Norte	Iuzon
San Idelfonso	Ilocos Sur	"
Solvec	" "	"
San Fernando (Poro)	La Union	"
Masinloc	Zambales	"
Subic	"	"
Mariveles	Bataan	"
Batangas	Batangas	"
Nasugbu	"	"
Virac	Albay	"
Bulan	Sorsogon	"
Gubat	"	"
Calapan	Mindoro	Mindoro
Mangarin	"	"
Santa Cruz	Marinduque	Marinduque

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Ports Open to Coastwise Shipping (Continued)

<u>Port</u>	<u>Province</u>	<u>Island</u>
Romblon	Romblon	Romblon
Belaboc	Palawan	Palawan
Cullion	"	"
Puerto Princesa	"	"
Masbate	Masbate	Masbate
San Pascual	"	"
Borongan	Samar	Samar
Carangian	"	"
Catbalogan	"	"
Maasin	Leyte	Leyte
Ormoc	"	"
Tacloban	"	"
San Jose Buena-vista	Antique	Panay
Capiz	Capiz	"
New Washington	"	"
San Carlos	Negros Occidental	Negros
Dumaguete	Negros Oriental	"
Larena (Siquijor)	" "	"
Toledo	Cebu	Cebu
Tagbilaran	Bohol	Bohol
Puluan	Zamboanga	Mindanao
Jimenez	Misamis Occidental	"
Cagayan	Misamis Oriental	"
Surigao	Surigao	"
Nasipit	Agusan	"
Iligan	Ilanao	"
Makar	Cotabato	"
Parang	"	"
Glan	"	"
Mati	Davao	"
Cagayan de Sulu	Sulu	Sulu Archipelago
Sitankai	"	" "

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Summary data relative to pre-war facilities of the more important national ports and harbors, open only to coastwise or interisland shipping, are given below:

1. Ports in Luzon

San Fernando (Poro). - Western coast northern Luzon, La Union Province; terminus railway from Manila; no wharves, cargo handled by lighters or landed at Poro. Two wharves at Poro; Manila Railroad pier (eastern wharf) with railway tracks and pipe line connections for discharging and loading oils; depth of 26 feet alongside pile clusters off pier's end (June 1938). Concrete west wharf had depth 12 feet; used only in calm weather.

Masinloc. - Zambales Province; concrete dock built by Benguet Consolidated Mining Company about 1 mile northwest of town; face 60 feet with depth 37 feet (Oct. 1937); narrow gauge railway on wharf for transporting ore from storage bins. Town of Masinloc in vicinity valuable timber; small vessels built; sawmill 1 mile south of town.

Mariveles. - Southern tip Bataan Province, at northern entrance point Manila Bay; excellent harbor, sheltered from all but southeasterly winds, good anchorage. Wharf with depth 25 to 28 feet alongside. Quarantine station in northwestern part of harbor.

Batangas. - Principal town on Batangas Bay, Batangas Province; terminus railway from Manila and transfer point for traffic to northern Mindoro and to Marinduque. Three-fourths of a mile inland on Calumpan River. Excellent concrete pier at village of Santa Clara; depths 20 to 5 feet from outer and along north face and 17 to 5 feet along south face.

Bulan. - Southwestern coast Sorsogon Province; frequent steamers to and from Manila; abaca and copra exported. Concrete pier affording berth one vessel at end; depth 9 feet. Two small private landings each with 4 feet depth at end.

Gubat. - Eastern coast Sorsogon Province; abaca and copra exported. Northern Bay open to wind but sheltered from sea by reefs and good anchorage for launches drawing not over 3 feet. Beach reached by means narrow channel dug through the reef.

2. Visayan and Other Small Island Ports

Calapan. - Northern coast Mindoro Island; capital Mindoro Province. Reinforced concrete L-shaped wharf, 140 feet long at outer end, depth 13 feet (May 1938), cargo shed. Gasoline, Diesel oil, kerosene and lubricating oils available in small quantities. Copra and abaca exported.

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Mangarin. - Southern tip Mindoro, formed by coast of Mindoro and Ilin Island; bay affords good anchorage all classes vessels most seasons of year. Sugar central railway wharf at Caminawit Point near head of bay accommodated vessels up to 250 tons; depth 11 feet along-side face of wharf (April 1937). Several warehouses on Caminawit Point; plantation railroad extended inland from landing to sugar central at San Jose.

Romblon. - Northwestern side Romblon Island between Sabang and Rosas Points; capital Romblon Province. Submarine cable connection with Manila. Small wooden landing with depth of 10 feet; depths along sea wall, short distance northward, from 3 to 5 feet. Small quantities kerosene and gasoline available in tins.

Puerto Princesa. - East coast of Palawan; capital Palawan Province and largest municipality on island. Rock causeway and concrete T-shaped wharf extending 455 feet from shore; docking space 116 feet; depth 24 feet alongside, with depths 30 feet 5 yards off. Diesel oil, gasoline and kerosene obtainable; sawmill near town and machine shop capable minor repair work. Copra, lumber and rattan exported.

Masbate. - Eastern coast Masbate Island; capital Masbate Province. Copra and cattle shipped north. Three small landings and government wharf under construction. Depths alongside (April 1938): Northwestern wharf, 23 feet; 2nd wharf, 33 feet; 3rd, 20 feet; and southwestern wharf, 15 feet. Gasoline in tins and Diesel oil in drums available. Harbor easy of access and well sheltered from all winds; entrance channel about 325 yards wide.

Catbalogan. - Western coast Samar Island at head of small bay and at mouth Catbalogan River; capital Samar Province and principal distributing center for island. Government pier with depths (May 1938) from 19 to 11 feet alongside fender piles. Short breakwater extended southward from outer end of causeway section of wharf, affording shelter for small boats. Limited quantities gasoline, Diesel oil and lubricating oils available.

Borongan. - East coast Samar near mouth Locom River. Concrete pier on southern shore of bay about $\frac{1}{2}$ mile east of river; depths (May 1938) 21 feet at end, 17 feet at inner pile cluster alongside eastern face, and 9 feet at inner pile cluster alongside western face. Pier protected by breakwater short distance to east. Copra exported.

Ormoc. - Western coast Leyte Island, northeastern part Ormoc Bay; largest town western Leyte. Concrete government pier with depth (May 1938) 16 feet at end, shoaling gradually along each face to 5 feet at shoreward fender-pile clusters. Sawmill and ice plant in town; gasoline in tins and Diesel oil in drums available.

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Tacloban. - Northeastern coast Leyte Island; capital and largest town of Leyte Province; important center for shipment abaca and copra, and distributing center for considerable area. Gasoline, Diesel oil and lubricating oils available in fair quantity. Small machine shop in town with electric welding equipment and small lathe. Excellent marginal wharf with extension northward under construction in October 1938. Depths (July 1938) alongside from 21 to 15 feet. Wharf electrically lighted. Vessels drawing 18 to 20 feet entered harbor from south; larger vessels anchored vicinity Dio-Islet in 5 or 6 fathoms mud bottom. Usual anchorage in harbor was 300 or 400 yards north and northwest of the town.

Capiz. - Northern coast Panay Island on north bank Panay River about 3 miles from mouth; capital Capiz Province; trade center northern Panay; connected with Iloilo by rail; cable connection with Manila. Reinforced concrete pier at port; two converging breakwaters extended from opposite shores, entrance about 120 yards wide. Depth at dock (January 1939) 17 feet at low water. Copra principal export.

San Jose de Buenavista. - Southwestern coast of Panay Island; capital Antique Province. Excellent wharf on concrete piles affording berthing space 75 feet long with depth 17 feet (December 1938) alongside. Turning room in depths greater than 2 fathoms extremely limited. Gasoline, kerosene, Diesel and lubricating oils obtainable in small quantities. Ores, copra, rice and sugar exported.

San Carlos. - Northeastern coast Negros Island, Occidental Province. Two wharves at San Carlos Point: western of wood with depth 23 feet at end; eastern of concrete with depth 33 feet at end. Wharf at San Carlos sugar central one-half mile north of town with depth of 30 feet at end. Six mooring buoys maintained by sugar company; 20-ton crane on the wharf and automatic conveyor for loading sugar. Ferry communication to Toledo, Cebu Island. Sugar and tobacco exported.

Dumaguete. - Capital and largest town in Oriental Negros Province, southeastern coast of Negros Island. Wharf with depths (April 1938) 26 to 11 feet alongside northern face and 35 to 15 feet alongside southern face. Vessels called regularly from Manila and Cebu en route to Mindanao ports. Abaca, copra and sugar exported. Gasoline, Diesel and lubricating oils and hardware available in small quantity. Small machine shop in town with welding equipment.

Toledo. - Largest town on west coast of Cebu Island; road connection along the coast and across the island to Cebu City. Excellent concrete pier; depth of 10 feet (July 1938) at end. Gasoline and Diesel oil could be purchased.

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Tagbilaran. - Capital of Bohol Province; southwestern extremity of Bohol Island. L-shaped concrete government pier afforded berthing for one large vessel alongside its outer face. Controlling depth (February 1939) 20 feet alongside. Wharf electrically lighted; cargo shed. Gasoline, Diesel and lubricating oils purchased in small quantity; machine shop with acetylene welding equipment in town.

3. Ports in Mindanao

Puluan. - On south side of Dapitan Bay, northern coast of Zamboanga Province. Reinforced concrete pier; depth (June 1937) 27 feet off fender piles at end of dock and depths alongside decreasing to 15 feet at inner pile cluster on western side. Boats called regularly during southwest monsoon when it was too rough to load off Dipolog. Road to Dipolog and Dapitan. Sawmill at Dapitan.

Jimenez. - On Iligan Bay, eastern coast Misamis Occidental Province. Wharf was termination of main street leading to town; depth at end (January 1939) 20 feet.

Cagayan. - Northern coast of Mindanao; capital Misamis Oriental Province; about 2 miles from mouth of Cagayan River. Excellent concrete wharf about 600 yards south of lighthouse on Macabalan Point; sufficient berthing space for two of larger interisland vessels. Depths alongside (June 1938) varied from 25 feet at northern end to 16 feet at southern end. About 25 feet off face of dock depths increased to 33 and 22 feet, respectively. Town had ice plant and several small machine shops where minor repairs could be made; welding equipment but no foundry work could be done. Gasoline and lubricating oils stocked in tins in small quantity. Diesel oil not always available.

Surigao. - Capital Surigao Province, northern Mindanao; at eastern side of mouth of Surigao River. Most of trade of eastern Mindanao passed through port; gold and iron mining activities in vicinity. Reinforced concrete marginal wharf; depths (June 1938) alongside outside pile clusters varied from 13 feet at northeastern end to 30 feet at southwestern end. Jetty, located at northeastern end of wharf, projected about 80 feet seaward and at right angles to shore. Several small landings on either side of wharf accommodating small craft only. Diesel oil, stored in bulk, secured from pipe line at dock. Gasoline lubricating oil obtained in small quantity. Several small tugs based at Surigao and a few lighters available.

Iligan. - Southeastern part Iligan Bay, northern coast Mindanao, at mouth Iligan River. Trade of Lake Lanao district, central Mindanao, passed through Iligan; principal products copra and corn. Concrete pier north of river's mouth; depths at dock (April 1938) 43 feet at outer end, 15 feet midway along the faces, thence decreasing to approximately zero at inner end. Survey in April 1939 showed depth

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of 36 feet at the wharf. Gasoline, Diesel oil and lubricating oil obtainable in small quantities. Highway southward to Cotabato and Davao.

Parang. - Port for Cotabato, situated at head of Polloc Harbor, western coast of Cotabato Province. Excellent concrete landing, I-shaped, with groups of fender piles along north and south faces but none across the end. Depth (July 1938) 30 feet at southwest corner, decreasing to 4 feet near the pier end of causeway. Depths along north face varied from 17 to 6 feet. In the latter part of 1938 extension of the pier was under way.

Glan. - Largest settlement on Sarangani Bay, southern Cotabato Province; copra and abaca exported; small amounts of Diesel oil, lubricating oil and gasoline stocked for local use. Concrete wharf and connecting causeway recently built; face of dock about 80 feet long; depths (July 1937) 12 to 18 feet alongside outside fender piles, greater depth being at western end.

D. Municipal Ports

Data relative to pre-war facilities at some of the more important of the municipal ports are reported in the United States Coast Pilot for the Philippines as summarized below:

1. Ports in Luzon

Santa Cruz. - Santa Cruz Point, Zambales Province, western coast of Luzon. Wharf at Balurata $1\frac{1}{2}$ miles to southwest; depth 30 feet off fender piles at end (October 1937). Ocean-going vessels loaded chrome ore from Acoje mine in Zambales.

Sorsogon. - Capital Sorsogon Province, on Sorsogon Bay, largest and best harbor in southern Luzon. Two small wharves and long stone causeway which had depth 7 feet at end (April 1938); fender pile-clusters permitted vessels to lie across end; cargo shed on end of causeway.

Magallanes. - Western coast Sorsogon Province near entrance Sorsogon Bay. Wharf under construction 1938 to provide berthing space 645 feet with depth $16\frac{1}{2}$ feet alongside.

2. Ports in Visayan Islands

Arory. - Northern coast Masbate Island; shipping point for gold mines in vicinity. Wooden pier; depth 11 feet at end (April 1938).

Bais. - Sugar shipping port southwestern part Bais Bay, eastern coast Negros Island, Negros Oriental Province. Wharf with depth $15\frac{1}{2}$ feet at end.

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Silay. - Negros Occidental Province, northwestern coast Negros Island. Excellent pier at terminus of road leading to town; controlling depth (May 1937) 12 feet at end (April 1938).

Bais. - Sugar shipping port southwestern part Bais Bay, eastern coast Negros Island, Negros Oriental Province. Wharf with depth 15½ feet at end.

Silay. - Negros Occidental Province, northwestern coast Negros Island. Excellent pier at terminus of road leading to town; controlling depth (May 1937) 12 feet at end, 11 feet along north face, and 10 feet along south face; ferry connection with Iloilo.

Bacolod. - Capital Negros Occidental Province; 8 miles south of Silay; largest town in Negros Island. Wharf used for loading lighters during sugar-milling season extended from south bank Mandalagan River; low-water depth 3 feet (May 1937) at pier; railroad laid on pier; stationary crane at end capable of lifting 25 tons. Machine shops for minor repairs.

Pambuhan. - Largest, best protected, and most accessible harbor on east coast Samar Island. Wharf of Samar Mining Company south of town; depth (May 1938) 23 feet at southern pile cluster and 29 feet at northern.

3. Ports in Mindanao

Dapitan. - Northern coast Mindanao, Zamboanga Province; reinforced concrete pier at Port Puluan on Dapitan Bay; depth (June 1937) 27 feet off fender piles at end of dock, decreasing alongside to 15 feet at inner pile cluster on western side.

Oroquieta. - Capital Misamis Occidental Province, northern coast Mindanao, on left bank at mouth Oroquieta River. Stone causeway with reinforced concrete pier extended seaward 110 yards; depth 10 feet along southern face and 27 feet along northern.

Bugo. - Misamis Oriental Province; wooden wharf 200 feet long with depth (April 1938) 30 feet alongside. Wharf and packing plant constructed by Philippine Packing Company (canners of pineapples).

Butuan. - Northern coast Mindanao, capital Agusan Province, west bank Agusan River 5 miles from sea. Two marginal wharves: downstream wharf of timber, deck and apron on concrete piles; depth 14 feet alongside; small cargo shed on wharf; upstream wharf for launches only.

Placer. - Northeastern coast Surigao Province; shipping point for surrounding mining district. Rock causeway and timber landing; depth 13 feet (July 1937) at landing.

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Port Lamón. - Eastern coast Mindanao, Surigao Province. Wharf of Port Lamón Lumber Company on north side Lamón Bay; depths (July 1937) 24 to 28 feet at face of wharf, greater depth at western end. Wharf reserved for vessels calling at Lumber mill.

Mati. - At head Pujada Bay, eastern coast Davao Province. Reinforced concrete landing affording berth for one vessel at end; depth (November 1938) 20 feet.

Daliao. - Mouth of Daliao river south of Davao on Davao Gulf. Good wharf; depth (July 1937) 14 feet at end; railway laid on pier and portable motor cranes capable of 15-ton lift available.

Naga Naga. - Southern coast Zamboanga Province. Site sawmill and wharf Mindanao Lumber Company. T-shaped wharf; face 390 feet long; depths (June 1937) from 19 to 24 feet alongside, deeper water toward southern end.

Caldera. - Southwestern end Zamboanga Province on Caldera Bay. Two small wharves (private) each accommodating one steamer; depth outer wharf 28 feet and inner 14 feet at ends.

Isabela. - Northern coast of Basilan Island, south of Zamboanga Province. Two wharves; largest providing berthing space 200 feet with depth 18 feet at west end and 29 feet at east end (June 1937). Small landing had depth 12 feet alongside. Lumber shipping point; daily launch service to Zamboanga.

E. Ports and Harbors Under the Japanese

Pier No. 7 at Manila, reportedly badly damaged during the early part of the war, is believed to have been repaired by the Japanese, who have also extended the sea wall in Manila Harbor southward from the Manila Yacht Club basin, according to reliable informants. Japanese reports that the drydock Dewey - scuttled by the United States Navy - has been refloated are substantiated by reports from other sources, and it is believed that a considerable number of the tugboats and lighters scuttled in Manila harbor and the Pasig River by the USAFFE have been reclaimed by the Japanese. Immediately after the fall of Manila all facilities for salvaging and repairing sunken vessels were seized by the Japanese, including equipment of the Atlantic Gulf and Pacific Company, the Earnshaw Docks and Honolulu Iron Works, the government drydock at Engineer Island, and the Luzon Stevedoring Company.

It is believed that dredging operations in the Manila port area have not been maintained by the Japanese, and that consequently there may have been much silting.

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At the outbreak of the war damage by fire was reported to the timber sections of piers at Poro, Jose Panganiban and other ports in Luzon, and in May 1942 a typhoon reportedly damaged the dock at Port Lamon, Mindanao. With the abundance of timber available in practically all areas of the Philippines, however, repairs to wooden wharves and docks should not present serious problems for the Japanese.

Mechanical loading and unloading facilities for handling large freight tonnages, which were available only at the Manila docks, were put out of commission at the beginning of the war, and unless the Japanese have been able to install new cranes it is probable that Manila's freight handling equipment remains useless. Cranes capable of handling small freight — available at Iloilo, Panay Island, Hondagua in Luzon, and at San Carlos and Bacoloc in Negros — may still be intact and operable. At other docks, where wharves accommodated vessels ranging from ocean-going to small coastal craft, all loading and unloading was by ship's tackle. It would seem probable that the Japanese have not been able to materially improve or augment these cargo-handling facilities.

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III. SEWERAGE

Manila, Baguio, Vigan (capital of Ilocos Sur) and Zamboanga had sewer systems before the war, while another was under construction in Quezon City. None, however, was equipped with a sewage treatment plant. The Manila system consisted of about 500,000 feet of sewer main and 10,000 sewer connections which served only a portion of the city. Latrines and privies were in general use. The city's raw sewage, without treatment, was discharged in Manila Bay at a point about one mile from shore.

Outside the few cities mentioned no publicly organized system of sewage disposal existed. Drainage ditches, creeks and streams near barrios and towns were used for waste disposal, as well as for bathing, laundry, and irrigation. Under the initiative of a public health program, however, many Filipino homes were equipped with so-called "bored-hole" latrines located close to the house but away from the water source. Reportedly one to every eight inhabitants, these latrines were thought to be sufficient for sanitary needs.

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IV. PUBLIC BUILDINGS AND IMPROVEMENTS

A. Buildings

1. Under the American Regime

A number of fine public buildings, combining modern construction materials and classic architectural designs, were erected in Manila in recent years. An impressive new Post Office and Custom House were in use before the war, while a new edifice to house the Department of Finance and a large new City Hall were just completed. The National Assembly and the University of the Philippines — including the General Hospital — were housed in splendid modern structures, as was Quezon Institute on the outskirts of Manila. All government buildings were maintained in good condition.

Plans of the Philippine Commonwealth, inaugurated in 1935, included the construction of new buildings to house all important agencies of the National Government. When war came considerable construction was under way in the district between the old and new Luneta parks in Manila, but it was intended to concentrate the leading government offices in Quezon City, northeast of Manila. Before the war street and road systems were fairly well completed and some building foundations laid in Quezon City, but plans for the new metropolis were still largely on paper.

Outside of Manila modern government buildings were to be found in most provincial capitals, some of them imposing structures. Post offices and customhouses of substantial modern construction were also the general rule, while municipal government buildings and school houses were likewise frequently well built, modern structures.

A thoroughly modern architectural and building achievement is the residence of the American High Commissioner in Manila, completed in 1939 by the United States Government. Erected on made ground, the building stands on Dewey Boulevard at the water front, south of the United States Army and Navy and the Elks Clubs.

2. Spanish Buildings

Chief among old Spanish buildings in Manila is Malacanán Palace on the northern bank of the Pasig River. This former home of Spanish Governors became the residence of American Governors General and later of the President of the Philippines. While the general Spanish atmosphere of Malacanán has been retained, frequent repairs and remodeling have modernized much of the construction.

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Within the Walled City a number of old Spanish buildings were used for government offices before the war. Noteworthy examples are the former National Assembly building and the Intendencia, or Philippine Treasury. The latter building was bombed by the Japanese during the siege of Manila.

B. Monuments and Churches

1. Monuments

The historical monument held in greatest veneration by Filipinos is probably the memorial in Luneta Park, Manila, to Jose Rizal, leading Filipino patriot and hero of the revolution against Spain in 1896. Also of special historical significance is the memorial known as "The Cry of Balintauac," erected at Balintauac, just north of Manila in Rizal Province, in commemoration of the outbreak of the revolution at that place. The largest and most modern Philippine monument, erected in memory of Andres Bonifacio, another hero of the uprising against Spain, also stands at Balintauac.

The founder of the University of Santa Tomas, Father Benavides, is honored by a statue in front of the old university building in the Walled City, and another statue of significance to Filipinos is that of Simon de Anda, Judge of the Supreme Court, who resisted the British at Manila in 1764.

Practically every town in the Philippines boasts a monument in its public plaza, and many of these are in memory of Rizal.

Among the more significant monuments erected by the Spaniards are the following:

- (a) Monument to Magellan on Mactan Island, off the coast of Cebu, where he was killed in combat with native chieftains.
- (b) An enclosed cross marking the landing place of Magellan at the town of Cebu.
- (c) A small concrete monument at Magallanes, near Butuan, northern coast of Mindanao, on the legendary site of Magellan's first landing in the Philippines.
- (d) Statue in Manila to Sebastian del Cano, the member of Magellan's party who continued the voyage around the world and returned to Spain.
- (e) Legaspi-Urdaneta monument erected in Manila to the memory of Legaspi and his priest-navigator, Urdaneta, sent to the Philippines by Philip II of Spain to plan for colonization of the islands. Legaspi became the first Spanish Governor of Manila.

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2. Churches

The many Catholic churches in the Philippines are of historical interest and are held in considerable veneration by the people. St. Augustine in the Walled City and the Cathedral in Manila are among the more famous. The latter was damaged by Japanese bombing. Many of Manila's dozens of churches are very old and often in a general state of disrepair. San Sebastian, of modern steel frame construction, is a noteworthy exception.

Every little town throughout the provinces has its church, legacy of the days of Spanish rule. These in general were in fairly dilapidated condition before the war.

C. Situation Under the Japanese

The Japanese are believed to have taken over most government buildings in Manila, including the High Commissioner's residence, Fort Santiago, and all other military establishments. They have appropriated the new Finance building, and are understood to be occupying at least a part of the City Hall.

Information as to the ability of the government as now constituted to maintain repairs to public buildings and city improvements is lacking, but it is believed that little if any funds are available for such purposes. Reliable sources indicate that streets in Manila — of asphalt if not concrete construction — suffered considerably from military operations, and were allowed to remain in a serious state of disrepair. It is understood that the Japanese have erected many wooden military barracks in the public parks of Manila. These are probably in the old and new Luneta parks and the public playgrounds and recreation centers which surround the Walled City in the area of the old moat.

In March 1944 radio broadcasts from Manila announced that the puppet President Laurel had signed an appropriation bill providing 100,000 pesos (\$50,000) for the construction of an ornamental fence around the monument of Jose Rizal in Manila, as well as 30,000 pesos (\$15,000) for restoration of the house in Calamba, Laguna Province, where the hero was born.

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V. APPENDICES

A. Plants of the Manila Electric Company - 1937

<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>ALBAY:</u>			
Guinobatan	Guinobatan	60 and 40	Diesel
Ligao	Ligao	20	"
Oas	Oas	18 and 18	"
<u>BATANGAS:</u>			
Bolboc	Bolboc	24	"
Lipa	Lipa	30 and 90	"
<u>BULACAN:</u>			
Baliuag	Baliuag	Manila Extension	"
Bigaa	Bigaa	" "	"
Bocaue	Bocaue	" "	"
Bulacan	Bulacan	" "	"
Calumpit	Calumpit	23	"
Guiguinto	Guiguinto	Manila Extension	"
Hagonoy	Hagonoy	" "	"
Malolos	Malolos	" "	"
Marilao	Marilao	" "	"
Meycauayan	Meycauayan	" "	"
Obando	Obando	" "	"
Paombong	Paombong	" "	"
Polo	Polo	" "	"
Plaridel	Plaridel	" "	"
Sta. Maria	Sta. Maria	" "	"
<u>CAMARINES SUR:</u>			
Naga	Naga	64, 120, and 120	"
"	Magarao	" " " "	"
"	Camaligan	" " " "	"
"	Canamen	" " " "	"
<u>LAGUNA:</u>			
Alaminos	Alaminos	" " " "	"
Binan	Binan	" " " "	"
"	Cabuyao	" " " "	"
"	Calauan	" " " "	"
Botocan	Luisiana	16,960	Hydro
	San Pedro	"	"
	Santa Rosa	"	"

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A. Plants of the Manila Electric Company - 1937 (continued)

<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>LA UNION:</u>			
San Fernando	San Fernando	39 and 39	Diesel
		39 and 48	"
	Bauang	San Fernando Extension	"
<u>RIZAL:</u>			
Manila	Antipolo	Manila Extension	"
"	Binangonan	" "	"
"	Caloocan	" "	"
"	Cardona	" "	"
"	Cainta	" "	"
"	Las Pinas	" "	"
"	Malabon	" "	"
"	Ft. McKinley	" "	"
"	Muntinglupa	" "	"
"	Navotas	" "	"
"	Paranaque	" "	"
"	Pasay	" "	"
"	Pasig	" "	"
"	Pateros	" "	"
"	S. Felipe Neri	" "	"
"	S. Juan del Monte	" "	"
"	S. Pedro Makati	" "	"
"	Taytay	" "	"
"	Tagig	" "	"
<u>SORSOGON:</u>			
Gubat	Gubat	48	"
Irosin	Irosin	16	"
<u>TARLAC:</u>			
	Camiling	Dagupan Extension	"
Tarlac	Tarlac	120, 100' and 64	"
	Victoria	Tarlac Extension	"
<u>TAYABAS:</u>			
Atimonan	Atimonan	120	"
"	Gumaca	Extension from Atimonan	"
Lopez	Lopez	34 and 45	"
	Lucban	Extension from Botocan	"
	Lucena	Extension from Botocan	"
	Pagbilao	Extension from Botocan	"

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A. Plants of the Manila Electric Company - 1937 (continued)

<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>TAYABAS</u> (cont'd)			
Lopez	Unisan	31	Diesel
	Candelaria	Extension from Botocan interconnect with Phil. Power and Dev. Co.	"
	Dolores	" " " "	"
	Tiaong	" " " "	"
<u>MANILA:</u>			
Manila	Manila	29,500	Steam
<u>NUEVA ECLJA:</u>			
Cuyapo	Cuyapo	38	Diesel
Gapan	Gapan	90 and 48	"
"	Jaen (Extension of Gapan)	" " "	"
"	S. Isidro (Extension of Gapan)	" "	"
San Jose	San Jose	72	"
<u>PANGASINAN:</u>			
Dagupan	Dagupan	72, 120, 160, 120, and 250	"
"	Balungao	Extension of Dagupan	"
"	Bautista	" " "	"
"	Bayambang	" " "	"
"	Binalonan	" " "	"
"	Calasiao	" " "	"
"	Malasiqui	" " "	"
"	Manacag	" " "	"
"	Mangaldan	" " "	"
"	Mangatarem	" " "	"
"	Rosales	" " "	"
"	Pozorrubio	" " "	"
"	San Carlos	" " "	"
"	San Jacinto	" " "	"
"	Sta. Barbara	" " "	"
"	Urbistondo	" " "	"
"	Urdaneta	" " "	"
"	Villasis	" " "	"

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B. Government and Other Private Plants - 1937

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>ABRA:</u> Urbano Banez	Bangued	Bangued	25	Diesel
<u>AGUSAN:</u> Butuan Saw Mill Butuan Saw Mill	Butuan Cabadbaran	Butuan Cabadbaran	45 37.5	" "
<u>ALBAY:</u> Saturnino Benito Saturnino Benito	Legaspi Tabaco	Legaspi, Camalig, and Daraga Tabaco	450 66	" "
<u>ANTIQUE:</u> Isidro Perez	San Jose	San Jose	46	"
<u>BATAAN:</u> Balanga Power Co.	Balanga	Balanga, Abucay, Orani, Orion, Pilar, and Samal	300	"
<u>BATANGAS:</u> Incio Velasquez Lopez Hermanos Municipality Municipality. Central Atucarera D. Pedro	Alitagtag Balayan Batangas Bauan Nasugbu	Alitagtag Balayan Batangas Bauan Nasugbu, Lian	17 30 300 40 390	" " " " "
<u>Philippine Power Development Eliseo Silva Sto. Tomas Elec. Dev. Co. Municipality</u>	Calamba Rosario Sto. Tomas Taal	Tanauan, Malvar Rosario Sto. Tomas Taal, Lemery	28.2 16 175	Hydro Diesel " "

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B. Government and Other Private Plants - 1937 (continued)

Province and Name of Operator	Location	Municipalities Served	Capacity in KW	Type of Prime Movers
<u>BOHOL:</u>				
Municipality	Tagbilaran	Tagbilaran	80	Diesel
Jagna Electric Co.	Jagna	Jagna	15	"
Baclayan Electric	Baclayan	Baclayan	9	"
Jesus Bano	Calape	Calape	11.2	"
Jose Bano	Dawis	Dawis	11	"
Jose Zarraga	Loay	Loay	10	"
Rafael Garces	Maribojoc	Maribojoc	11.2	"
<u>BULACAN:</u>				
Ambracio Andres	Angat	Angat, Norzagaray	60	Diesel
Pullian Electric Co.	Pullian	Pullian	50.2	"
Pedro Mossesgeld	Santiago	San Ildefonso	20	"
Jose de Leon	San Miguel	San Miguel	82	"
Pedro Mossesgeld	Santiago	San Rafael, Bustos	52	"
<u>CAGAYAN:</u>				
Municipality	Aparri	Aparri	14.5	"
Municipality	Ballesteros	Ballesteros	15	"
Red Line Transportation	Tuguegarao	Tuguegarao	210.5	"
<u>CAMARINES NORTE:</u>				
Gacho & Hidalgo	Daet	Daet	130	"
Clemente Hidalgo	J. Pangasinan	J. Pangasinan	50	"
Clemente Hidalgo	Paracale	Paracale	110	"
<u>CAMARINES SUR:</u>				
Los Banos Bros. Elec.	Iriga	Iriga	38.2	"
Service	Libmanan	Libmanan	14	"
Patricio Genova	Goa	Goa	25	"
Jose Centenera	Tigaon	Tigaon	25	"
Consuelo Vda. de Toral				

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B. Government and Other Private Plants - 1937 (continued)

Province and Name of Operator	Location	Municipalities Served	Capacity in KW	Type of Prime Movers
<u>CAPIZ:</u>				
Calivo Electric & Power	Calivo	Calivo	45	Diesel
Josefa Vda. de Hernandez	Capis	Capis	206	"
Bartolome Venus	N. Washington	N. Washington	12	"
Amado Bayot	Panitan	Panitan	16	"
<u>CAVITE:</u>				
F. de Vries	Amadeo	Amadeo	9.2	"
Imus Electric Co.	Imus	Imus, Bacoor, and Dasmariñas	232	"
F. de Vries	Indang	Indang	96	"
F. de Vries	Mendes-Nunes	Mendes-Nunes	4	"
Elena Naval Vda. de Paes	Silang	Silang	120	"
<u>CEBU:</u>				
Municipality	Argao	Argao	30	"
Jacinto Vela	Bantayan	Bantayan	18	"
Vicente A. Racasa	Barili	Barili	29	"
Visayan Electric	Bago	Bago	34	"
Carcar Electric Co. Inc.	Carcar	Carcar	90	"
Visayan Electric	Cebu	Cebu, Danao, Compostela, Liloan, Consolacion, Talisay, Minglanilla, Naga, and S. Fernando	3,172	"
		Dumanjug	42.35	"
		Opon	40	"
		Sibonga	22	"
<u>COTABATO:</u>				
Cotabato Light & Power Company, Inc.	Cotabato	Cotabato	122	"

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>DAVAO</u>				
Davao Light & Power Co. Inc.	Davao	Davao	551.5	Diesel
Davao Light & Power Co. Inc.	Guinaga	Guinaga	19	"
Davao Light & Power Co. Inc.	Sta. Cruz	Sta. Cruz	12.4	"
<u>ILOCOS NORTE:</u>				
Bacarra Elec. Power Co. Inc.	Bacarra	Bacarra	16	"
Ilocos Norte Elec. Co. Inc.	Laoag	Laoag, San Nicolas	366	"
Batac Elec. Light Co. Inc.	Batac	Batac	30	"
<u>ILOCOS SUR:</u>				
Teodora & Filomena Donato	Vigan	Vigan, Bantay	187.5	"
Mara Vda. de Talavera	Cardon	Cardon	70	"
<u>ILOILO:</u>				
Cresenciano L. Elliot	Alimodian	Alimodian	10	"
Panay Electric Co. Inc.	Iloilo	Iloilo, Arevalo	1,485	"
Oton Electric Co.	(Oton, Oton)	Jare and La Paz, Oton	--	"
Claudio Siaocong	Barotac, Nuevo Barotac, Nuevo	Barotac, Nuevo Barotac, Nuevo	11	"
Piadosa Dominado de	Dumangas	Dumangas	15	"
Buenafior	Estancia	Estancia	12	"
Alfonso Gumire	Januay	Januay	17	"
Januay Electric Light, Company, Inc.	Leon	Leon	10	"
Jose Mirasol	Miagao	Miagao	25	"
Claudio H. Akol	Passi	Passi	34	"
Noises Iturraldi	Pototan	Pototan	57	"
Pototan Electric Co.	Sara	Sara	27	"
Victorino M. Salcedo	Sta. Barbara	Sta. Barbara	28.8	"
Ledesma Sisters	Tigbuan	Tigbuan	18	"
Tigbuan Electric Co.				

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Mover</u>
ISABELA:				
Rafael Lahoz	Echague	Echague	34	Diesel
Iligan Elec. & Ice Corp. Inc.	Iligan	Iligan, Bagumbayan	144	" "
Gaudencio Sarangaya	Santiago	Santiago	12.5	
IAGUNA:				
Philippine Power Dev. Co.	Calamba and Nagcarlan	Bay, Calamba, Iilio Los Banos, Majavjay, Nagcarlan, Pila, and Rizal	1,562	Hydro
Cacho & Hidalgo				
Elisa Cajipe	Pagsanjan	Pagsanjan, Lumban	130	Diesel
Santa Cruz Electric	Paete	Paete	35	" "
Glorin Gomez de Ong	Sta. Cruz	Sta. Cruz	140	" "
Caliraya Hydro Electric	Siniloan	Siniloan	18.4	
	Lumban	Manila	27,000	Hydro
LANAO:				
Lanao Elec. Light & Power Supply Company	Dansalan	Dansalan	105	Diesel
Consuelo Borja	Iligan	Iligan	55	" "
LA UNION:				
Maria Vda. de Talavera	Agoo	Agoo	27	" "
Paciano Rimando	Naguilian	Naguilian	20	" "
LEYTE:				
Hijos de Escano	Bato	Bato	12	" "
Mamel Mraga	Baybay	Baybay	54.5	" "
Carigara Elec. Co. Inc.	Carigara	Carigara	27	" "
Gil Garcia	Maasin	Maasin	45	" "
Hijos de Escano	Malitbog	Malitbog	45	" "
Ormoc Electric Light	Ormoc	Ormoc	64	" "
Palo Electric Light Plant	Palo	Palo	25	" "

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>LEYTE (Continued)</u>				
Aboso, Inc.	Paloanpon	Paloanpon	22	Diesel
Tacloban Electric Inc.	Tacloban	Tacloban	451	"
Tanauan Elec. & Light Co.	Tanauan	Tanauan	18	"
<u>MARINDUQUE</u>				
Boac Electric Co.	Boac	Boac	59	"
Municipality	Sta. Cruz	Sta. Cruz	25	"
<u>MASBATE</u>				
Masbate Cinema Light Co. Inc.	Masbate	Masbate	32	"
<u>MINDORO</u>				
Calapan Electric Co.	Calapan	Calapan	60	"
Municipality	Manjan	Manjan	15	"
Ir-Isco Encarnacion	Pola	Pola	22	"
<u>MISAMIS OCCIDENTAL</u>				
Natalio Digal	Oroquieta	Oroquieta	30	"
Misamis Lumber Co.	Misamis	Misamis, Clarin, Tudela	125	"
Teofilo M. Pereyra	(Tangub, Tangub)	Tangub	17	"
<u>MISAMIS ORIENTAL</u>				
Cagayan Elec. Power & Light Co. Inc.	Cagayan	Cagayan	160	"
Leon Borromeo	Mambajao	Mambajao, Camigin	26.5	"
<u>MOUNTAIN PROVINCE</u>				
City of Baguio	Baguio	Baguio	1,180	Hydro
"	"	"	125	Diesel
Provincial Board	Bontoc	Bontoc	20	"

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
NEGROS OCCIDENTAL				
Anselmo Dias	Bacolod City	Bacolod, Talisay	454	Diesel
Cesar Poblador	Bago	Bago	42	"
Miracol Electric Plant	Binalbagan	Binalbagan	45	"
Hernandez Belmonte	San Enrique	San Enrique	15	"
Mameli Guaycong	Saravia	Saravia	30	"
Silay Elec. Light & Ice Plant	Silay	Silay	200	"
Guillermo Prosbitero	Valledolid	Valledolid	30	"
Basilio Tanguo	Victorias	Victorias	50.5	"
Nueva Compania Electrica Ino.	Cediz	Cediz	35	"
Fausto Guillion	Escalante	Escalante	20	"
Francisco E. Ramos	Himamaylan	Himamaylan	22	"
Salvador Ledesma Arguelles	Hinigaran	Hinigaran	81	"
Ricardo Gimera	Ilog	Ilog	22	"
Municipality	Isabela	Isabela	50	"
Mamuel Alvares	Kabuntalan	Kabuntalan	50	"
Deogracias Gamon	La Carlota	La Carlota	20	"
Felix Ferria	La Castellana	La Castellana	53	"
Agueda A. Gonzaga	Bo. Ma-ao	Bago	20	"
David P. Ganson	Manapla	Manapla	22	"
Miguel Peres y Tejido	Murcia	Murcia	20	"
Pulpandan Light, Power & Ice Plant, Ino.	Pontevedra	Pontevedra	25	"
San Carlos Elec. Light Company, Ino.	Pulupandan	Pulupandan	100	"
	San Carlos	San Carlos	62	"
NEGROS ORIENTAL				
Julian Teves	Bais	Bais	34	"
Vicayan Electric	Dumaguete	Dumaguete	196	"
Julian Teves	Guinhuligan	Guinhuligan	32	"
Julian Teves	Tanjay	Tanjay	34	"

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>NEUVA ECLJA:</u>				
Victorio Dionisio	Bongabong	Bongabong, Laur	30	Diesel
Samahang Magsasaka	Cabanatuan	Cabanatuan	495	"
Cabiao-Arayat Electric Co.	Cabiao	Cabiao, Arayat	202	"
Domingo Vergara	Guimba	Guimba	40	"
Roman Garcia	Penaranda	Penaranda	25	"
San Antonio Electric	San Antonio	San Antonio	50	"
Jose Venturina	Sta. Rosa	Sta. Rosa	31	"
Raymundo David	Talavera	Talavera	24	"
<u>NEUVA VIZCAYA:</u>				
Southern Electric Light	Bambang	Bambang	--	--
Solano-Bayambang Elec. Light Company	Bayambang	Bayambang, Solano	123	Diesel
<u>PAMPANGA:</u>				
Teresa Gomes de Nepomucano	Angeles	Angeles, Magalang, Porac	296	"
Roman Balyot	Apalit	Apalit, Macabobe, Masantol, S. Luis, and San Simon	124	"
Jacinto Genuino	Sta. Ana	Sta. Ana, Candaba	75	"
Ice & Elec. Light	Guagua	Guagua, Sexmoan	135	"
Plant Co. Inc.	Ibaao	Ibaao, Floridablanca	50	"
Ibaao Elec. Co. Inc.	Mabalacat	Mabalacat, Bambang	68	Hydro
Mabalacat Hydro-Elec. Company, Inc.	San Fernando	San Fernando, Bacolor, Sta. Rita, 368 Minalin, Mexico	368	Diesel
San Fernando Elec. Light				
<u>PANGASINAN:</u>				
Joacoba L. de Concepcion	Alaminos	Alaminos	43	"
Provincial Government	Lingayen	Lingayen, Birmaley	220	"
Philippine Engr. Corp.	Tayug	Tayug	15	"

B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>RIZAL:</u>				
Mamel Alvares	Tanay	Tanay	45	Diesel
Marikina Electric Light Co.	Marikina	Marikina	328	"
Esteban Florencio	San Mateo	San Mateo	38	"
Jose de Borja	Morong	Morong	30	"
Federico San Juan	Montalban	Montalban	22	"
<u>ROMBLON:</u>				
Francisco Benedicto	Romblon	Romblon	37.5	"
<u>SAMAR:</u>				
Samar Elec. Light & Power				
Samar Dev. Co. Inc.	Calbayog	Calbayog	45	"
Catarman Electric Light Co.	Catarman	Catarman	25	"
Municipality	Cathalogan	Cathalogan	119	"
Guiwan Electric Plant	Guiwan	Guiwan	45	"
Company, Inc.				
<u>SORSOGON:</u>				
Bulan Elec. & Ice Plant Inc.	Bulan	Bulan	125	"
Municipality	Donsol	Donsol	10.2	"
Municipality	Juban	Juban	21	"
Municipality (Leasee)	Magallanes	Magallanes	12	"
Dr. Victor Lee (Leasor)				
Municipality	Pilar	Pilar	10	"
Vda. e Hijos de Luis Martinez	Sorsogon	Sorsogon	60	"
<u>SULU:</u>				
Jolo Power Co.	Jolo	Jolo	240	"

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B. Government and Other Private Plants - 1937 (continued)

<u>Province and Name of Operator</u>	<u>Location</u>	<u>Municipalities Served</u>	<u>Capacity in KW</u>	<u>Type of Prime Movers</u>
<u>SURIGAO:</u> Surigao Electric Co.	Surigao	Surigao	40	Diesel
<u>TARLAC:</u> Compania Luz Electrica Josefina R. de Ramirez	Concepcion Paniqui	Concepcion Paniqui, Gerona, Moncada	79 75	" "
<u>TAYABAS:</u> Tomas Morato Municipality Tayabas Light & Power Co.	Calauag Sariaya Tayabas	Calauag Sariaya Tayabas	30 149 130 33.6 25	Steam Diesel " Hydro Diesel
Mauban Electric Plant	Mauban	Mauban		
<u>ZAMBOANGA:</u> Visayan Electric Co. Province of Zamboanga	Dipolog Zamboanga	Dipolog Zamboanga	34 300 456 10	Diesel Hydro Diesel "
J.C. Trota	Lamitan	Lamitan		

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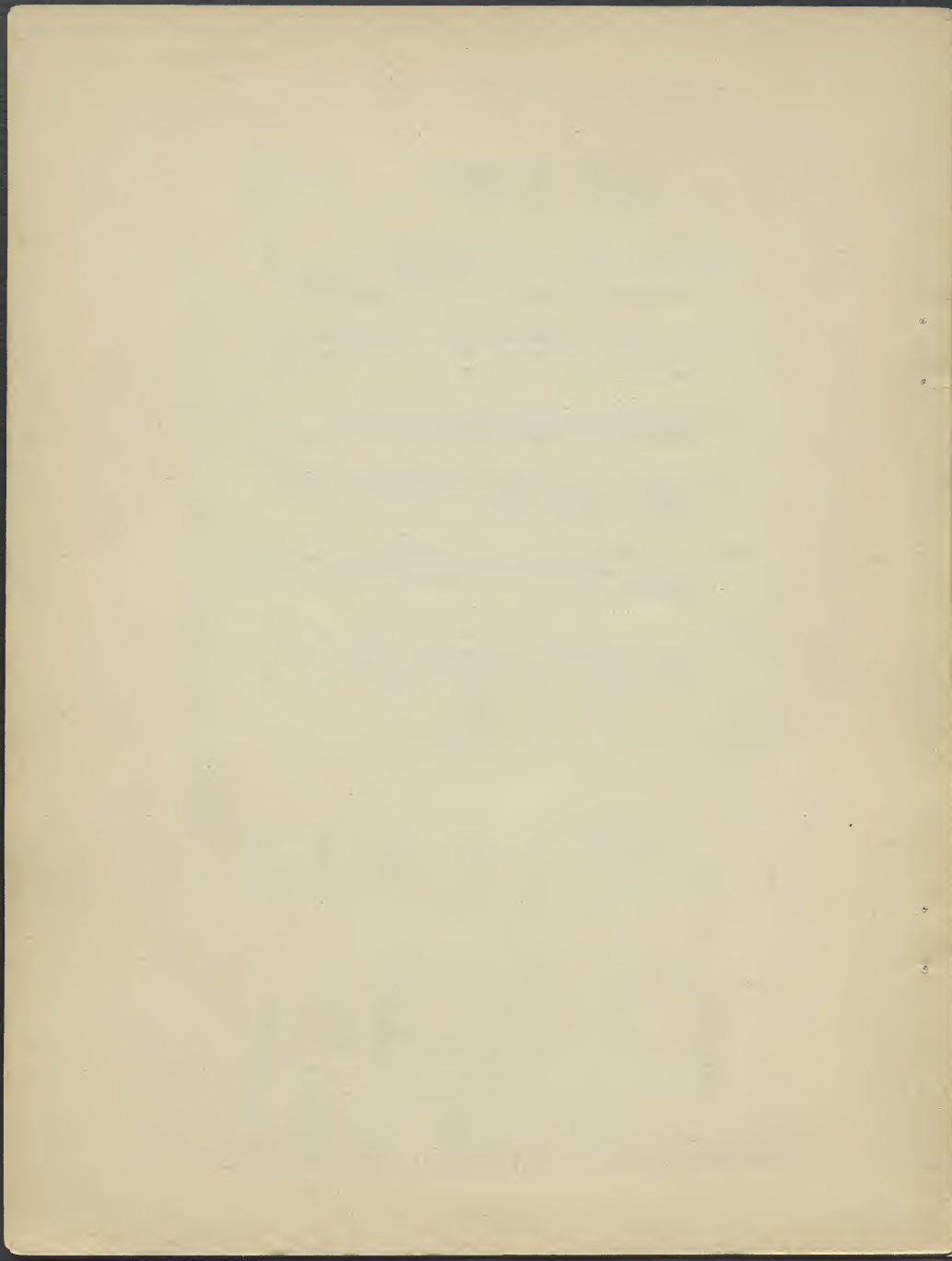
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